

東日本大震災

～震災を振り返って見えてきた課題～

5 階病棟

The Great East Japan Earthquake

- Our challenges coming into view after looking back on the earthquake disaster -

The 5th Floor Ward

はじめに

阪神・淡路大震災以来、災害防災への取り組みの重要性が取り上げられてきた。高い確率で宮城県沖地震が発生するといわれてきた中で、防災対策への不安を抱えながら私たちはそれぞれの部署で災害発生時対応の取り組みや、防災マニュアルの見直し、学習会を試みてきた。

Introduction

Since the Great Hanshin-Awaji Earthquake, the importance of committing to disaster preparedness has been brought to the fore. While the Miyagi-Oki (off the coast of Miyagi) Earthquake was predicted to occur with a high probability, with anxiety we had worked on how to respond to disaster of its occurrence, revisited our disaster preparedness manual and tried to hold study meetings in each department.

しかし、3. 11 マグニチュード 9. 0 の地震そして巨大津波の発生は私たちの想像をはるかに超えるものであり、かつて遭遇したことのない状況であったことは言うまでもない。地震・津波・火災……。そして多数の犠牲者。災害の質も今まで想定され、訓練されていたものとは異なるものであった。その中で不安や失望、肉体的・精神的疲労のギリギリの状態に追い詰められた私たちが病院の内外でどのようにその時を過ごし、のり越えていったのか。病棟スタッフへの意識行動調査をすることで今後の防災対策へのさらなる準備・対応となるのではないかと考えた。

However, the occurrence of the magnitude 9.0 earthquake on March 11 and subsequent giant tsunamis, were far beyond our imagination, and it goes without saying that we were in a situation that we had never encountered. Earthquakes,

tsunamis and fires... Furthermore, we had a large number of victims. The attributes of the disaster were different from what we had ever assumed and practiced. In such a situation, we were being driven to our limit by anxiety and despair as well as by physical and mental fatigue; how did we spend this period in/outside of the hospital and overcome the situation? By examining the consciousness and action of our ward staff, we thought that the result of this investigation might aid in further preparations for future disaster preparedness.

地震発生直後の病棟の状況

3. 11 は内科・外科カンファレンスのため手術は予定されていなかった。
病棟の状況は下表のとおりである。

The situation of our ward immediately after the earthquake

On March 11, no surgeries had been scheduled as a conference between the internal department and the surgical department would be held.

The situation of our ward was shown in a table below.

患者数：32 名（担送 8・護送 20・独歩 4）

重症行動注意者：10 名

内訳： 呼吸状態不良；1
全身状態不良；1
転倒注意；2
精神状態不安定；3
自殺企図；2
不穏状態；1

勤務者：12 名（副師長 1 名・看護師 9 名・看護助手 2 名）

ケア状況

意思疎通困難：1 酸素療法：2 吸引：2 輸液ポンプ：6 持続点滴：11

化学療法：1 ドレーン管理：9 全身清拭：15 部分清拭：14 口腔ケア：5

入浴介助：1 フォーレ留置：7 排泄介助：17 褥瘡管理：9 体位変換：3

食事介助：11 経管栄養：3

被害状況：病棟床一部亀裂・病室壁面一部亀裂・スプリンクラーの固定具緩み・大倉庫と病棟接合部分の断裂・大倉庫壁面の落下・患者説明室のタイルの落下

The Number of Patients: 32 (Stretcher 8, Escort 20, Ambulatory 4)

The Number of Patients Requiring Careful Attention to Their Behaviors: 10

The Details In poor breathing State: 1
In poor general state: 1
Requiring attention of falls: 2
In an unstable mental state: 3
Suicidal: 2
In a restless state: 1

Staff Members: 12 (1 Deputy Head Nurse, 9 Nurses, 2 Nursing Assistants)

The Situation of Care

Having difficulties in communication: 1 Oxygen therapy: 2
Suction of sputum: 2 Use of an infusion pump: 6 Continuous infusion: 11
Chemotherapy: 1 Drain management: 9 Whole body wiping: 15
Partial wiping: 14 Oral care: 5 Bathing assistance: 1
Foley catheter placement: 7 Toileting assistance: 17
Pressure ulcer management: 9 Postural change: 3 Feeding: 11
Tube feeding: 3

Damage Situation: Partially cracked ward floor, partially cracked walls of hospital rooms, loosening of fasteners of sprinklers, some gaps in a ward joint between our ward and our large warehouse, falling of walls in our large warehouse, falling of tiles in our explanation-room for patients

地震発生当日の対応

師長が長期不在で、看護部長が病棟師長を兼務していたため、当病棟では病棟師長の指揮はなかった。

Our response on the day of the earthquake

Our head nurse was on a long-term absence, and the nursing director of the hospital concurrently was serving as the head nurse of our ward, so there was no command from our ward's head nurse.

揺れが収まって間もなく、スタッフはそれぞれに対応を始め、患者の安全確認をした。医師の指示にて、点滴のヘパロック・抜針等の措置がとられ、輸液ポンプは中止とし、どうしても必要な場合に限り非常電源へ切り替えて使用を続けた。

Shortly after the shaking subsided, each member started to respond by confirming the safety of our patients. Following our doctors' directions, measures such as the heparin lock of infusions and the removal of infusion needles were carried out and we

stopped most infusion pumps, however, some were kept on to be used only when necessary with the power being switched to emergency power supply.

当病棟では患者病室の損傷は軽度であったが、病室と倉庫の間の亀裂が大きく、建物倒壊への危険性があり、避難誘導のため北側避難口付近の 1 か所に患者を集めた。この間にも何度も余震があり、安否確認のため多くの人が病院へ来院した。個人識別のため名前・年齢・住所・[氏名]・病棟名を記載したガムテープを服に貼付した。

The damage of hospital rooms in our ward was mild, but the crack between a hospital room and our warehouse was big enough to become a risk of building collapse, so we got our patients together in one place near the emergency exit of the north side for evacuation. During this period, we had a lot of aftershocks, and many people were coming to the hospital to confirm the safety of their relatives. For personal identification, we attached a snip of packaging tape on the patients clothes which stated the patient's name, age, address and ward name were written.

時間の経過とともにスタッフが参集して来た。精神的に不安定で状況を理解できない方、勝手に外に避難する方など指示に従っていただけない方もおり、参集したスタッフと共に手分けして患者への対応・安全の確保を行った。寒さは厳しかったため、患者には布団を配り、看護師は各自のカーディガン等で保温に努めた。20 時ころ患者へ備蓄食料から給食配給があったが、家族や面会の方にはなかったのでスタッフ用のお茶・コーヒーの提供を行った。

As time passed, our staff gathered. There were some people who could not follow our instructions, such as those who could not understand the situation because of mental instability and those who were arbitrarily evacuating outside. All of us including some members who had been able to come here separately, responded to the patients and confirmed their safety. As the cold was severe, we handed out futons to the patients, and the nurses tried to keep themselves warm by wearing their cardigans. Around 20 o'clock, the patients were provided with meals from our food supplies, but we did not provide food to their family members and visitors, instead we provided them with tea and coffee, courtesy of our staff's.

また市内の様子・院内の状況などの詳細な情報が入らず、患者はもちろん、スタッフも漠然とした不安感を抱いていた。病院の外へ目を向けると内湾一帯に火災が広がっており、この光景を目の当たりにして不安が増強した。

In addition, as we had no detailed information on the situation of the city or the inside of the hospital, our staff as well as the patients had anxiety. When we took a look at the outside of the hospital, fire had spread around the inside of the bay, and our unease escalated after we witnessed the scene.

震災翌日(3. 12)～2 週間(3. 25)の様子

① 患者受け入れ(震災翌日 3. 12)

当病棟は院内最上階にあり、自家発電中はエレベーターが使用できないため患者を受け入れようにも担架搬送しかない。そのため、トリアージポストと同じ階にある 2 階西病棟に新規入院患者のベッドを確保すべく、2 階西病棟入院中の患者を受け入れることとなった。

The situation 2 weeks from the day after the earthquake (March 12 to March 25)

1) The acceptance of patients (following the day of the earthquake, March 12)

Our ward was located on the highest floor of the hospital building, and we had no way of accepting patients except by stretcher because elevators were unavailable under in-house power generation. In order to secure beds for new inpatients in the west ward on the 2nd floor (the same floor as the triage post), we decided to accept patients in the west ward on the 2nd floor at the front entrance (the entrance of the hospital is located on the 2nd floor of the hospital on a small hill).

② 深夜火災(震災 5 日目)

3 月 15 日深夜 1 時過ぎ、市内内の脇方面から火災が発生した。延焼の危険性が高かったため再度病棟にいる全ての人に名前と 5 階病棟と記載したガムテープを服に貼り、避難準備に入った。付添されている家族・患者にも状況を説明したうえで避難待機の協力をお願いした。

2) Midnight fires (the 5th day of the earthquake)

Around a little past 1 a.m. on March 15, fire broke out from the Nainowaki Area (an area close to the bay) in the city. As the fire had a high risk of spreading, we again used packaging tape for nametags, on which the patient's name and "the 5th Floor Ward" were written. These were stuck on the clothes of all patients in the ward to prepare for evacuation. After we explained the situation to both the family attendants and the patients, we asked them to cooperate with each other when waiting to evacuate.

③ 患者搬送

電気の復旧と電力供給の安定により日常ケアは通常通りになりつつあったが、従来通りの治療が十分に行えない状況にあったため、3 月 23 日に患者の東北大学病院搬送が決定された。6 名の大学病院転院（ヘリ搬送）、1 名の介護施設搬送が決まり、同日中に看護要約の作成・個人データの取りまとめを行った。3 月 24 日搬送当日、前日の準夜勤務者が院内に朝まで待機し、早朝よりヘリ搬送の準備・搬送患者の対応が行われた。

3) Patient transfer

Thanks to the restoration of electricity and stable power supply, our daily care was going back to normal, but within these circumstances we could not carry out usual

therapy sufficiently, which lead to the transfer of some patients to Tohoku University Hospital, determined on March 23. The hospital transfer of 6 patients to the university hospital (by helicopter) and the transfer of one patient to a nursing home were organized. We made nursing summaries and put together their personal data on the same day. On the day of the transfer, March 24, the late shift staff members of the previous day waited at the hospital until morning. From the early morning, they prepared for the helicopter-transfer of the patients and took care of those patients.

スタッフのおかれた状況

非番職員の多くは自宅で被災し、残してきた家族、余震への不安を抱えながら病院へ向かった。ほとんどの職員の通勤経路で交通規制があり、さらにガソリン供給の不足や公共交通機関の麻痺など通勤困難だったため病院での寝泊りを強いられた。

The situation of our staff

Many of the off-duty staff's homes were affected by the disaster and headed to the hospital with anxiety about their families left behind and aftershocks. There were traffic regulations on most of their commuting routes. Furthermore, they had many difficulties with their commute due to the lack of gasoline supply and the paralysis of public transport among others, which forced them to sleep in the hospital.

スタッフの葛藤

家族の安否がわからないまま勤務しなければならい状況に対する戸惑い、家族が心配でも帰れないジレンマも浮き彫りとなった。被災家屋を片付けたいが休みが取れないといった状況、家族を置き去りにしてまで仕事をしなければならないのかといった心の葛藤があったのも事実である。家族からも、一度出勤したら次はいつ帰ってくるのか...といった不安も聞かれた。家族（親子）がバラバラに生活するなどスタッフ本人はもとより、家族も肉体的・精神的にかなり追い詰められた状態での生活が2か月以上続いた。

The conflict of our staff members

Confusion about the uncertain situation, under which we had to work while not knowing if our families were safe, and the dilemma that we wanted to go home as our family was worried but could not go home in such a situation, were highlighted. In fact, we could not take days off in spite of wanting to clean up our affected house, working with the conflict that we had to do our job even with our family left behind. We heard of family members mention anxiously, "When will you come home next, once you go to work?". This severe situation continued for more than two months, under which not only staff members themselves were affected, but also their family members who were physically and mentally forced into a corner; for example, families where children and their parents had to live separately.

震災から見えてきた今後の課題と対策

平成 19 年に行われたトリアージ訓練においては外来系を主とした訓練であり、病棟での状況とは質を異にしていた。年 2 回行われる防災訓練では主に火災・地震による倒壊危険を想定されての訓練であり、今回の震災は災害の質が全くと言っていいほど違ったものであった。そのため、戸惑いのなかでの勤務を強いられた。

Our future challenges and measures highlighted by the earthquake disaster

The triage-drill held in 2007 was one mainly for outpatient care departments, which was different in characteristics from the situation of inpatient care departments. Our disaster prevention training being held twice a year was one assuming the risk of building collapse mainly from a fire and an earthquake, to which the recent earthquake disaster had almost no similarities. As a result, we were forced to work in confusion.



連絡・情報収集の手段がなく、院内外の状況がつかめなかったため患者への情報伝達が不十分になってしまい理解・協力が得られないことも度々であった。患者を避難させるにしても避難経路の安全性はどうか、患者の安全を守るためにも院内外の情報の共有は必要不可欠事項であると思われた。

As we had no means of communicating and gathering information, meaning we were unable to grasp the situations of the inside and outside of the hospital, the transmission of information to our patients ended up being insufficient, and we frequently could not obtain the patients' understanding and cooperation. To confirm the safety of the evacuation routes even in the case of our patients' evacuation, it would be essential for us to share the information of the inside and outside of the hospital to protect their safety.

また、震災当時、師長が長期にわたり不在中だったため、副師長をはじめスタッフ各々において強い不安感と精神的負担が大きかったことは言うまでもない。地震発生後、普段通りの 3 交代制は家族への負担が大きく、緊急時の勤務体制システムについて準備不足を感じた職員もいた。

In addition, as our head nurse was on a long absence at the time of the earthquake disaster, it was needless to say that each staff member including our deputy head nurses felt very uneasy and had large mental burdens. After the earthquake, the

burdens of our usual three shift members' families were large, and some staff members felt a lack of preparation for our emergency working system.

また、今回の震災では病棟内で被害が少なかった北側病室に患者を誘導し、待機させることができた。これにより、患者の安全確保と状態把握が迅速にでき、早め早めの対応をすることができた。大規模災害の際にはいかに早く患者の安全を確保し、避難に備えるかが要求される。その観点から今回の患者誘導は的確であったと考える。院内最上階にある当病棟において、迅速に患者避難を完了させるためには北側避難通路を利用しなければならない状況にあるため、北側病床に搬送手段別に患者一時避難を行い、二次避難に備えなければならなかった。搬送手段表示と一時避難訓練、加えて二次避難訓練は当病棟のみならず、すべての病棟・関係部署において必要であり、患者の安全を確保するためには今後シミュレーションを行っていかなければならない課題である。

In the earthquake disaster, we were able to guide the patients to the hospital rooms on the north side of the ward, which had less damage, and have them wait. That enabled us to secure their safety and to grasp their condition quickly, allowing us to respond to the situations as soon as possible. In the case of a large-scale disaster, it is essential to ensure the safety of patients and to prepare for evacuation as early as possible at all costs. From that viewpoint, we think our patient guiding procedures this time to have been correct. In our ward, which was located on the highest floor of the hospital, we were in a situation where we needed to utilize the northern evacuation routes to quickly complete the evacuation of patients. Since it is necessary to use the northern evacuation passage in order to complete the patient evacuation promptly, it was necessary to temporarily evacuate the patients to the north sick-beds by means of transportation to prepare for the secondary evacuation. Clearly displaying the transfer means (for every patient), and training for temporary and secondary evacuation are necessary not only for our ward but also for all other wards and relevant departments; those challenges must be simulated in the future so that we can ensure the safety of patients.

病棟における独自の食糧調達必要性も高まった。非常に寒かったためコーヒーやお茶の提供ができたことは面会者には非常に喜ばれ、スタッフにおいても活動のエネルギー源となっていた。面会者の方およびスタッフ分の食糧も患者同様、早期に病院から配給されることが必要だと思う。同時に当病棟のみならず、全病棟に災害対策本部から備蓄食料を配布するシステムを構築するか、災害セットの中にスタッフ分の備蓄食料を組み込むことも必要かもしれない。

The need for procuring our own food in our ward also increased. As it was very cold, we could serve the visitors some coffee and tea, which gave them joy, also providing our staff some energy. The hospital needs to distribute food for visitors and staff as

well as for patients as early as possible. It would also be necessary to build a system of delivering food supply from the Emergency Response Headquarters to all the wards as well as our ward, or add food supply for the staff into the emergency kit of each ward.

震災をふりかえり……

日頃の訓練、防災グッズの必要性、指示系統の一本化など病棟の課題・病院全体の課題が明確化された。防災マニュアルや対策の必要性を感じるが、これほどの震災となると一人ひとりの対応能力が必要とされてくることを感じた。その能力・人間力がつながり、チームとして対応していく力を短期間で作り上げていくことが必要である。

Looking back on the earthquake...

The issues of each ward and the entire hospital such as daily training, the need of emergency goods and the integration of our command systems have been clarified. Although we have noticed the need of the manual for disaster preparedness and measures, we have also thought that the response capability of each member would be required when it comes to a great disaster like this. It is necessary that we build our capability to respond to a situation as a team in a short period of time by integrating the capability of human resources.

また、すべてのスタッフにおいて家族の一員として、家庭より仕事を選ばなければならぬことへの葛藤、病院より家族を守りたい、身内の安否確認を優先したいという思いを胸に秘め業務にあたっていたことも事実である。

On the other hand, it is also true that all of our staff members were working not only with the conflict that we had to prioritize our service more than our homes even though we were a member of our own family but also the desire that we wanted to protect our family more than the hospital and prioritize the safety confirmation of our relatives.

おわりに

防災グッズの充実と、緊急時の備えを家族と話し合っておくことが必要と感じた。また、人と人とのつながりなどで精神的に非常に助けられた。支援していただいた多くの方々の力によって、病院にいるすべての人々の安全が守られたことを忘れてはいけない。

In conclusion

We have noticed that it is necessary to establish emergency goods and keep up dialogue with our family about emergency preparedness. In addition, we were saved mentally greatly by interpersonal relations. We must never forget that the safety of all the people in the hospital had been protected by the power of many people who had thankfully supported us.

今までほかのところで起きていた震災は他人事のようであった。これほど大きな震災になるとは思ってもみなかった。今回の震災における職員の犠牲は幸いにもなかったが、職員家族に犠牲者があった。それでも院内にとどまり、業務にあたっていたスタッフもいる。肉親を失った悲しみは想像を絶するものであり、当事者でなければ理解しえないものである。また、被災スタッフは多数にのぼり、その思いもさまざまである。海岸線に位置するこの気仙沼において災害対策に津波の脅威というものは忘れてはいけない。今後、東日本大震災と同等もしくはそれ以上の地震・津波が来ると想定した場合、すぐ参集できるかとの問いに、ほとんどの職員が状況次第と答えた。現在参集基準として気仙沼市内震度 5 強以上とあるが、津波警報発令されるとなると参集職員の数が大きく減る可能性が高い。今後は災害発生時いかに少人数で対応するかを含め検討していかなければならない。師長不在の中、みんなで協力し、互いを思いやり、そして患者・面会の方を含めた全員の安全を確保できたことは、全スタッフにおいて今後の励みとなることだろう。

We had thought of earthquake disasters as something that happens elsewhere as if it were someone else's affairs. We had never thought that the earthquake would be so great. Fortunately, there were no victims among our staff in the recent earthquake, but there were victims in some of the staff's families. Nevertheless, some members were still remaining in the hospital and were in charge of service. Their sorrow of the loss of their relatives is impossible to imagine, which only the people concerned can understand. And, many staff members were affected and have various emotions and thoughts. Here in Kesennuma, which is located on a coastline, we must never forget the threat of tsunami when we consider disaster measures. To the question "if an earthquake and a tsunami larger or equal to the Great East Japan Earthquake is assumed to occur in the future, can you immediately come to the hospital?," most of the staff answered, "it depends on the situation." The present criterion of staff-gathering with the seismic intensity is equal to or greater than upper 5 on the Japanese Seismic Scale in Kesennuma City, but if a tsunami warning is issued, the number of staff members that can come to gather in the hospital would reduce greatly with high probability. We must consider issues including how to respond to a situation in a small group in the event of a disaster in the future. In the absence of our head nurse, everybody worked together and cared for each other, and we ensured the safety of everybody including the patients and the visitors, which is encouragement to all staff members for the future.

外来部門

トリアージエリアでの救護活動

外科・整形外科・産婦人科・脳外科・泌尿器科・眼科・耳鼻科
皮膚科・内科・小児科・循環器科・内視鏡室・救急室

The department of the outpatient clinics

Relief operations at the triage areas

Surgery/Orthopedics/Obstetrics and Gynecology/
Brain Surgery/Urology/Ophthalmology/Otolaryngology/
Dermatology/Internal Medicine/Pediatrics/Cardiology/
Endoscope Room/Emergency Room

はじめに

市内にある個人病院の約半数以上が津波により被災したため、宮城県災害拠点病院である当院には災害直後より様々な患者が集中して来院した。多数の傷病者に対して、すぐにトリアージが実施され、私たちは各エリアの救護に携わり、災害医療をどうにか乗り切ることができた。

Introduction

Around more than half of private hospitals in the city were affected by the tsunami, immediately after the disaster, a large variety of patients were increasingly coming to our hospital, one of the disaster stronghold hospitals of Miyagi Prefecture. A triage was soon carried out to a large number of patients, and we got involved in relief operations in each area and managed to survive the medical care of the disaster.

1. 基礎データ

日勤者 6名（うち1名休憩中1名午後年休にて帰宅）

患者数 0 名

施設の被害状況 物品落下（本棚のファイルなど）

救急車搬入口に約 10cm の地盤沈下あり
→簡易のスロープを作成してもらう



地震により救急室搬入口に段差ができる

The difference in level created in the front of the ambulance entrance by the earthquake

The situation of the Red Area

1. Basic data

The total number of the staff members of our emergency room: 12 (including one member away on her child-care leave) at the occurrence of the disaster on March 11

The number of the day shift workers: 6 (including one taking a rest and one having taken an annual paid holiday and having returned home in the afternoon)

The number of patients: 0

The damage situation of the facility: fallen items (such as some files on bookshelves)

The land subsidence of about 10 cm had occurred in the front of the ambulance entrance, in need of simple slope.

2. 活動状況

○ 職員の安否確認

救急室では、災害時の連絡方法として、本人の携帯電話から救急室 PHS にメールを送信することにしており、年に1回模擬訓練を実施していた。メール内容としては①本人の安否②家族の安否③自宅家屋の損壊④参集の可否であり、3月11日の震災時も携帯がすぐに使用できなくなったスタッフ1名を除き、救急室に参集できなかったスタッフ3名の安否確認がスムーズにできた。また、メールの内容を救急室スタッフ被害状況集計表に記載することによりスタッフ全員の安否を把握できた。



2. Activity status

- **The safety confirmation of our staff**

In the emergency room, we had previously decided that each member should send e-mails to each mobile phone to an emergency room's PHS as a contact method in case of a disaster, and we had been simulating this at a training once a year. Each e-mail contains 1) each safety, 2) each family's safety, 3) the damage situation of each house, and 4) the possibility of coming to the hospital. Also at the time of the earthquake disaster on March 11, we could smoothly confirm the safety of 3 staff members who could not come to the emergency room except one, who could not use her mobile phone soon after the earthquake. In addition, we wrote the contents of their e-mails on the summary table of the damage situation of the emergency room staff, which enabled us to grasp the safety of our staff.

○ 患者の受け入れ状況

発災直後当院のマニュアルに沿って、救急室前にトリアージポストが設置された。しかし数十分後には東側にある病院入口にまで津波が押し寄せたため、西側の地下通用口にトリアージポストを移動した。4階の病棟の出入口からも避難者が入ってきており、医師が1名派遣された。17時頃には水が引き、救急室前にトリアージポストが再設置された。

○ The situation of patient acceptance

Immediately after the occurrence of the earthquake, a triage post was set up in front of the emergency room according to the manual of our hospital. However, as the tsunami rushed to the hospital entrance on the east side of the hospital (around the foot of a hill on which our hospital is located) as early as tens of minutes later, we moved the triage post to the basement door of the west side of the hospital. Evacuees were coming from the doorway of a ward on the 4th floor, so a doctor was stationed at the doorway. Water receded by about 17:00, and the triage post was re-installed in front of the emergency room.

[写真] 赤エリア 泥により汚染された手足の清拭を行う

[Photo] The Red Area: wiping limbs that had been contaminated with mud



当日は多くの外傷患者の来院を予想し、衛生材料などを多数準備していた。しかし実際はほとんどが低体温症や、溺水、燃えた重油が発生する黒煙の吸引による肺炎の患者だった。

た。大多数の患者は津波により身体が濡れ、泥により汚染された状態で、できる範囲内で体や手足の清拭を行い、病衣に着替えさせた後に準備していた布団乾燥機や手術室の保温マット、電気毛布、加温補液を使用し保温を行いながら対応にあたった。

On the day, we anticipated many trauma patients and were preparing a large number of goods such as sanitary materials. However, most of patients were actually those with hypothermia, drowning and pneumonia due to the black smoke produced from burning heavy oil. The majority of patients were wet from the tsunami and were contaminated with mud; we wiped their body and limbs as much as possible, had them change their clothes into patient clothes and subsequently responded to their treatment while keeping them warm with pad dryers, the warming mats of the operating rooms, electric blankets and warmed bags of infusion solution, all of which had been prepared in advance.

当日の来院患者数は20名ほどと予想を大幅に下回った。これは、今回の震災死のほとんどが水死である事、道路の冠水による交通手段の断絶で来院できなかったことなどが原因と考えられる。PHS や外線電話が不通となり、昼夜問わず傷病者が救急車で搬送されてきた。同時に、院内 PHS も使用できなくなり、各々の医師の所在も明確に把握出来なかったために、診察や報告の連絡にも時間がかかった。

The number of patients coming to the hospital on the day were about 20, which was significantly fewer than we'd expected. This might have been because most of the earthquake deaths were due to drowning and they could not have come to the hospital due to the stoppage of transport by flooded roads among other reasons. PHS's and outside telephone lines could not been used, and victims were being transferred by ambulance night and day. At the same time, in-hospital PHS's also become unusable, and we could not secure the locations of each doctor clearly, which lead to time loss when trying to contact doctors about medical examinations and reporting.

翌日以降は DMAT や自衛隊が派遣され、軍用車両などで一度に多数の傷病者や診察不要と判断された救助者が一緒になって搬送され、トリアージポストは混雑した。傷病者の特徴としては低体温症や肺炎が多く、浸水で濡れた体は冷たいために生理学的評価が難しくオーバートリアージとなり、赤エリアに一時的に多数の患者が収容され、また、内科系疾患患者が多岐に渡って来院した。医師の要望により夜間は赤タグだけでなく、すべての患者の処置、検査を赤エリアで行った。帰宅可能な患者の交通手段はなく、患者を搬送してきた救急車が同じ方向へ帰属する場合には別の患者を同乗させてもらうよう手配を行うなど、帰宅患者にも配慮が必要であった。

From the next day, the DMAT and the Self-Defense Forces were dispatched. Many sick and injured people and other rescuees, who had been assessed to not need medical examination, were put together and transferred to our hospital by

Self-Defense Forces' motor vehicles all at once, making the triage post crowded. In regards to characteristics of those sick and injured, many had hypothermia or pneumonia; their bodies were cold having been in the flood. It made it difficult to physiologically evaluate them correctly and we ended up with 'over-triage'. A large number of patients were temporarily accommodated in the Red Area, and many patients with a wide variety of diseases of internal medicine were coming to the hospital. Upon our doctors' requests, examinations and treatment were carried out in the Red Area at nighttime for not only patients with red tags but also all other patients. We allowed patients whose condition were mild enough to go home, but they had no means of transport. Considerations also needed to be taken in order to solve these difficulties such as by arranging for patients to get on ambulances and ride share to their destinations after the ambulances transferred other patients to the hospital.

私達は治療はもちろん、清拭や処置、移送の合間に家屋が流出し悲嘆にくれる患者の想いを傾聴し、津波に流された事でおびえる患者には、少しでも安心感を与えられるよう“病院に来たからもう大丈夫ですよ”と声かけを行うなど、短い時間の中でも患者のこころの痛みに寄り添うように努めた。しかし、親や子供など近親者を亡くし、泣き叫びパニックになる患者に対しては、どのように声をかければいいのか戸惑いもあり、悲しみの感情を黙って受け止めるしかできなかった。

We tried to comfort the patients suffering emotionally during the short time between wiping, treating and transferring them as well as medical treatment: listening to the feelings of patients grieving over their house which had been washed away, and comforting the frightened patients that have been caught in the tsunami, saying things such as, “Having come to the hospital, you are out of danger now”, to give them a sense of security, even if only a little. However, for patients who had lost their close relatives, such as their parents and children, that were crying and wailing, we did not know how to console them. So, all we could do was silently accept their feelings.

【写真】 検査伝票をホチキス留めしたトリアージタグ

[Photo] A triage tag with stapled test slips



○

トリアージタグの活用

救急室では年に数回程度、実際にトリアージタグを用いた訓練を行っており、基本的な記載方法は理解していたので、ほとんどのスタッフがスムーズに活用できていた。しかし、タグに検査伝票と結果を何枚もホチキスで留めたことにより、記載内容やタグの

カテゴリー表示が見つらなくなってしまった。それで、クリアファイルにタグと伝票類をまとめ、患者の枕元に置いて対応したが、これは通常のトリアージタグとは異なる使用方法だった。また、電気復旧以降も従来のカルテデータベースシステムの復旧に時間がかかり、再来患者でも新しいタグで対応しなければならず、災害時の継続看護の難しさを実感した。

○ Making use of triage tags

As the staff of the emergency room were practicing the use of triage tags several times a year and had understood how to write basic items, most of the staff members were able to smoothly make use of tags. However, as several test slips and some result-sheets had been fixed to the triage tags, the descriptions and the expression of categories had become hard to see. We gathered together a tag and slips into a clear file folder, put it at each bedside to make use them; this was different from the usual. Furthermore, it took time to recover the conventional database system of medical records after outage restoration, and we had to respond by revisiting patients with a new tag, making us realize the difficulties of continuous nursing during disaster.

○ 勤務体制の整備・調整

当日は時間ごとに変則勤務を行い、翌日には救急スタッフ 3 名が到着し 3 交代の勤務となった。日勤帯では外科系・内科系外来スタッフの協力は得られていたが、夜勤はほぼ救急室のみで行い通常より夜勤人数を 1 名ずつ増加したためにスタッフが不足し途中 2 交代に変更する等、勤務体制の調整が行われた。道路の寸断で登院できなかった 1 名は避難所で救護活動を続け、7 日目に出勤し全員が揃った。家の罹災や、交通手段がなく帰宅できなかった看護師が 6 名ほどいたが、休憩場所は 4 畳もなく、すべてのスタッフが休憩を取るには不十分だった。そのため、4 階会議室、外科外来、ミーティングルームと場所を移動しながら仮眠を取った。また、医師は 6 グループでシフトを組み診察に当たっていたが、各々のグループで方針が異なり混乱することもあった。

○ Maintaining and adjusting our work system

On that day, we were irregularly working, 3 members of the emergency room arrived on the following day, and a three-shift system was underway. We were able to obtain the cooperation of staff members of outpatient surgery and internal medicine groups in the day shift period, but those of the emergency room almost only staffed the night shifts. As we increased the number of night shift members by one more than the usual, there was a lack of staff; we carried out the adjustment of our work system by switching to a two-shift system midway. One member of our staff, who had not been able to come to the hospital due the blockage of her commuting roads, continued to engage in relief activities at a shelter and came to the hospital on the 7th day after the disaster; all our staff were present. There were about six nurses, who could not go back home due to their housing situation or had no means of commuting. Their

resting place was smaller than a four-tatami room [13.2 m²], which was not sufficient enough for all the staff to take a break. Therefore, we were taking naps while switching the location of our resting place between the 4th floor conference room, the outpatient clinic of surgery and the meeting room. In addition, the doctors had set their shifts in six groups and were examining patients, but each group had a different policy, which occasionally lead to confusion.

患者数が増加傾向にあった 3 月 22 日より埼玉県の支援看護師が勤務に加わって下さり、極限状態にあったスタッフの精神的負担は軽減された。

Since March 22, when the number of incoming patients was increasing, the support nurses of Saitama Prefecture had thankfully joined us, which lessened the mental burden of our staff members in their extreme circumstances.

○ 医薬品・物品の確保

<物品>

点滴セット、注射器など多量に使用すると思われたものは物品管理室に連絡し、救急室まで運んでもらった。足りなくなった物品は連絡を入れると倉庫の職員が補充に来てくれていた。低体温による末梢循環障害があり、酸素濃度が測定できなかった為、血液ガス分析に多くを頼ることになり、血液ガス測定用採血キットの消費が比較的早く、シリンジにヘパリンを通して代用した。

○ Reserving medications and goods

<Goods>

With respect to what was assumed would be needed in large quantities such as infusion sets and syringes, we contacted the management room of goods and had those goods delivered to the emergency room. Some staff members of the warehouse were coming to refill what was running out whenever we called. Quite a lot of patients had peripheral circulatory failure due to hypothermia, which prevented us from measuring their oxygen concentration. Therefore, we had to rely more on blood gas analysis, and blood-collecting kits for blood gas measuring were consumed relatively quickly. We substituted heparin-filled syringes for those kits.

<医薬品>

薬品は、オーダーリングが使用できなかったために、薬剤部に電話連絡を入れた後、持ってきてもらったり、取りに行ったりして対応した。

<Medications>

As the ordering system could not be used, after calling to the pharmacy department, we had medications brought to us or went to get them to circumvent the situation.

<リネン>

発災後すぐに洗濯室に連絡し病衣、リネン類を運んでもらった。多くの患者の身体や衣類が濡れて、汚れており、ストレッチャーの上に敷いているシーツが不足気味になった。救急車やポンプ車で搬送されてきた場合、敷いてきたものをそのまま使用し、多少の汚染は拭いてそのまま使用する等して対応した。

< Linens >

Immediately after the occurrence of the disaster, we contacted the laundry room and had hospital gowns and linen brought to the emergency room. As the bodies and clothes of many patients were wet and dirty, sheets used for stretchers became rather short in supply. When a patient was transferred by an ambulance or a fire truck equipped with a pump, we responded to the situation as follows: using what had been laid under a patient in a vehicle without exchange it, using wipes even if they had a little dirt on them, etc.

黄色エリアの状況

震災時の状況

(1)震災時の様子

● 内科外来:看護師 9 名(2 名年次休暇)嘱託看護師 4 名勤務

診察はすべてのブースで終了しており、内科外来には輸血施行中の患者 1 名と気管支鏡検査（以下 BF）を予定して点滴施行中の呼吸器科の患者 2 名、さらにそれぞれの家族がいるのみであった。震災発生と同時に患者の安全確保をし、揺れが収まると患者・家族の安全を再度確認した。処置室には輸血の患者、診察室には BF 待機の患者がおり、処置室一か所に患者を集めた。滴下する輸血はまだ残っており、この後継続するか否か判断に迷ったが、医師より継続の指示があった。しかし病院全体が災害医療体制を配備しなければならず、外来処置室で患者を観察するのは困難と判断し、看護師が確実に常駐していることや病院設備の安全性を考慮した上で内視鏡室で輸血を継続することにした。

The situation of the Yellow Area

The situation of the earthquake

(1) The state of the earthquake

● The outpatient clinic of internal medicine: 9 nurses (2 nurses taking an annual paid holiday) and 4 part-time nurses on the job

Examinations had been completed at all booths, and there were only some people remaining in the outpatient clinic of internal medicine: In the outpatient department of internal medicine, there was one patient undergoing blood transfusion and two patients in the respiratory department who were undergoing infusion due to bronchoscopy (BF) (hereafter referred to as BF [bronchofiber]), as well as family members. At the same time as the earthquake occurrence, we ensured the safety of

those patients. After the shaking subsided, we again confirmed their safety as well as their family members'. There was one patient receiving a blood transfusion in the treatment room and two waiting for BF in the examination room, so we got them together in one place within the treatment room. There was still some blood to be transfused, and we felt uncertain whether we should continue the transfusion after that or not; we received the instructions to keep it in from our doctor. However, the entire hospital had to arrange the disaster medical system, and we decided that it was difficult to observe the patients in the outpatient treatment room; the blood transfusion was determined to be carried out in the endoscopy room after we considered that other nurses would be stationed there and that the hospital equipment of the room would be safe.

BF 待機中の患者 2 名は検査不可能であり、医師からの説明後抜針し帰宅させようとしたが、すでに津波の第 1 波が来ており、帰宅できず院内に留まることとなった。1 件目の BF はレントゲン室で行われていた。検査終了間際であり、地震と同時にファイバースコープが抜去された。停電で真っ暗になった部屋で、動かすことができなくなった検査台から検査を終了したばかりの患者を下ろさなければならなかった。幸いにも前処置で使用する懐中電灯が処置車に常備されていたため、その明かりで患者を検査台から下ろすことができた。その後は状態観察のため院内にしばらくいて帰宅許可が出たが、津波で帰ることができなくなっていた。

It was impossible to carry out the examinations of the two patients waiting for BF, so we removed their infusion needle and attempted to have them return home after the doctor's explanation. The first wave of the tsunami had already come, so they could not go home and had to stay in the hospital. The first BF of the day was being carried out in an X-ray room. At the time of completion, the fiberscope was removed at the same time that the earthquake occurred. In the room which was completely dark due to power failure, our staff members had to take the patient down from an examination bed, which no longer be moved, just after the examination. Fortunately, as a flashlight for pretreatment was kept always on hand in a treatment cart, the light allowed them to take down the patient from the examination bed. After that, the two patients stayed in the hospital for a while for the observation of their condition and then got permission to go home, but they were no longer able to go home because of the tsunami.

● 循環器外来:看護師 1 名勤務(1 名年次休暇)

心臓カテーテル検査施行中の患者 1 名がいたのみ。地震発生時、カテーテル抜去直後であった。従来心臓カテーテル検査後は車いすで患者を搬送するのだが、震災により院内が停電しエレベーターも使用できなくなったことから、車いすでの患者搬送は不可能となっ

た。医師の判断でレントゲンの検査台で 30 分臥床させ、その後患者の状態が安定しているのを確認し、2 階のレントゲン室から 4 階の入院病棟へ自力歩行で帰室させた。

● **The outpatient clinic of cardiology: one nurse on the job (one nurse taking an annual paid holiday)**

There was only one patient under examination of cardiac catheterization. At the occurrence of the earthquake, it was immediately after catheter removal. We would usually transfer patients after the examination of cardiac catheterization, but we were no longer able to transfer the patient by wheelchair at the time, as the hospital was blacked out by the disaster, and all the elevators were out of order. Based on the doctor's judgment, the nurse had kept the patient on the examination bed of the X-ray room for 30 minutes, subsequently confirmed that his[/her] condition was stable and had the patient go back on foot by himself [/herself] from the X-ray room on the 2nd floor to his [/her] hospital room on the 4th floor.

● **小児科外来:看護師 2 名勤務**

小児科外来には予防接種を終えた小児とその家族が 3～4 組。さらに当日は心臓小児外来がある日で、診察待ちの小児とその家族が 2～3 組いた。予防接種後 30 分は院内にいて状態観察するのだが、津波の被害がおよぶ危険のある場所に自宅がある 1 組以外は帰宅した。院内に留まった 1 組は病院で 1 泊し翌日帰宅していった。

● **The outpatient clinic of pediatrics: one nurse on the job**

In the outpatient clinic of pediatrics, there were some children who just had their vaccinations and 3 to 4 groups of family units accompanying them. Furthermore, the day was the consultation day of the outpatient clinic of pediatric cardiology, some children and 2 to 3 groups of their family were waiting for examination. The condition of those patients are usually observed for 30 minutes after vaccination in the hospital, but all of the families except one whose house was located in a place in a danger of tsunami-damage went home. The one family that remained in the hospital stayed overnight in the hospital and went home the next day.

● **内視鏡室:看護師 3 名、看護助手 1 名勤務**

1 名 BF の介助に入っており、残り 3 名は翌日の検査準備を内視鏡室で行っていた。地震発生後 1 名はさらに BF が行われていたレントゲン室に応援に行った。残り 2 名は設備点検と、その後内科外来から移送されてきた患者の状態観察を行った。

● **The endoscopy room: 3 nurses and one nursing assistant on the job**

One nurse was assisting with a BF examination, and the other three members were preparing for the next day's examinations in the endoscopy room. After the earthquake, one of us went to an X-ray room's aid where BF was being carried out. The remaining two checked equipment and continued observing the condition of

patients who were transferred from the outpatient clinic of internal medicine.

● 内科系外来に関連する場所の施設被害

大きく目立った損傷はなし。停電になるが自家発電が作動し明かりは確保できていた。

● Equipment damage in places related to the outpatient clinics of the internal medicine group

There was no remarkable damage. In spite of power failure, lighting equipment was kept on due to the in-house power generator.

(2)地震発生直後

地震発生後数十分は、看護師各々が自らの判断で行動していた。津波の被害が当院の1階までおよぶ恐れがあり、1階に入院している患者の移動を行ったり、患者が多く搬送されてくるのに対応できるように内科外来前待合ホールに様々な医療物品配置の準備を行ったり、患者受け入れがすぐできるように数カ所ある入り口で待機したりしていた。その後3階特殊外来はトリアージタッグ緑のエリア（翌日には内科外来前待合ホールに緑エリアの場所を変更）、内視鏡室と整形外科外来前ホールは黄色のエリアとして患者受け入れの準備を行っていった。組み立て式の簡易ベッドが運ばれ、20台ほど組み立てベッドの準備をしたものの、この簡易ベッドはパイプで組み立てるものであり、背部を冷たい風が通り抜けるため、海水で冷え切った患者の体を休ませるのには不適切なものであった。そこで普段診察待ちの時に座っている長椅子を二つ向かい合わせて8台のベッドを作った。その他、患者が低体温の状態で来院することを想定し、あるだけの毛布、布団、シーツ、検査表、電気毛布、布団乾燥機などを準備していった。さらに救急カート、自動血圧計などの医療機器、点滴や検査を行えるような物品の準備、また外傷に対応できるような準備も行った。



黄色エリア 整形外科外来前

The Yellow Area: in front of the outpatient clinic of orthopedics

(2) Immediately after the earthquake occurrence

Tens of minutes after the earthquake, each nurse was acting according to his or her own judgment. As there was a great risk of tsunami-damage reaching up to the 1st floor of our hospital, we transferred the patients on the 1st floor to other upper areas in the hospital. We prepared for the arrangement of various medical goods in the waiting hall in front of the outpatient clinic of internal medicine to respond to the transfer of many patients to the hospital. We were waiting at the several entrances in order to accept patients swiftly. The 3rd Floor Special Outpatient Clinic was assigned

for the area of patients with a green triage tag (the next day, the location of the Green Triage Area was changed to the waiting hall in front of the outpatient clinic of internal medicine), the endoscopy room and the hall in front of the outpatient clinic of orthopedics were assigned to the area of patients with a yellow triage tag, and we were preparing to accept patients. Although we brought the makeshift cots and prepared about 20 beds, the cots were unsuitable to rest patient bodies as they'd absorbed the cold of the seawater. The cot was made of pipes, and the cold wind went through under the bed. To make a bed, we put together two benches face-to-face, how patients usually sit while waiting for medical examination, and made 8 beds in total. Also, it was assumed that patients with hypothermia would come to the hospital, so we began to prepare as many things as we had such as blankets, bedclothes, bed sheets, examination-sheets, electric heating blankets and futon dryers. We also tried to prepare medical equipment such as emergency carts, automatic blood pressure monitors and other things that enabled us to carry out examination and infusion, and also prepared our response to the treatment of external injuries.

(3)患者受け入れ

トリアージタグ黄色のエリアに来院した患者は、震災当日から3月21日まで583名。その内訳は溺水、熱傷、骨折、脱臼、裂傷、発熱、嘔気、嘔吐、腹痛、下痢、頭痛、喘息発作、吐血など多様であった。この間心臓カテーテル検査が1件、緊急内視鏡検査が7件行われた。また震災後、多くの在宅酸素療法（以下HOT）患者が停電により酸素濃縮器が使用できず、自宅に残っている携帯酸素も使い切ったため来院した。しかし、当院も電力や液体酸素を確実に補給されるか不明で、病院機能維持という視点からもHOT患者を全て入院させることは難しいと考え、酸素なしで安静時のSpO₂が90%以上あり、全身状態が落ち着いていれば自宅待機の方針にした。

[写真] 黄色エリア 内視鏡室前②

(3) Accepting patients

Patients who had visited the Yellow Triage Tag Area since the day of the earthquake until March 21 were 583 in total. The details of the patients were varied including near-drownings, burns, fractures, dislocations, lacerations, fever, nausea, vomiting, abdominal pain, diarrhea, headaches, asthma attacks and hematemesis [vomiting blood]. During this time, one examination of cardiac catheterization and seven emergency endoscopy examinations were performed. In addition, after the earthquake, as many patients on home oxygen therapy (hereinafter referred as HOT) could not use their oxygen condensers due to power failure or used up their portable oxygen having remained at their home, came to our hospital. However, it was unclear if our hospital had a stable supply of electricity and liquid oxygen, and also judging from the viewpoint of maintaining our hospital functions, we determined it was difficult to

admit all the HOT patients into the hospital, and so we decided that they should stay at rest without oxygen at home if their SpO₂ was 90% or more and their general condition was stable.

(4) 治療

1) 患者リストとトリアージタグ

まず黄色エリアにトリアージされた患者はリストに氏名を記載する。震災直後は氏名のみ記入していたが、後に家族が捜しに来たり、帰宅した患者が数日後に再度来院することもあり、患者リストには住所、年齢（生年月日）症状及び病名、転帰などが追加された。一方トリアージタグには、トリアージの情報の他に、指示や経過などが記載されたが、タグの記載スペースは限られており全てを記載することはできなかった。今後は災害簡易カルテが必要と思われた。



黄色エリア 内視鏡室前 ②

The Yellow Area: in front of the endoscopy room ②

(4) Treatment

1) The patient list and triage tags

First of all, we put the names of patients triaged to the Yellow Area on the list. Immediately after the earthquake, only their names were written, but in the case their family members might come to look for them afterwards, or patients who had returned home might visit the hospital again several days later, we added their address, date of birth, symptoms and disease names, to the patient list. On the other hand, items including instructions and the course of each patient were written on a triage tag in addition to triage information; the space of a tag was too limited to include everything. We think that a simple medical record for the time of the disaster will be required in the future.

2) 薬の処方

薬局は薬を処方してもらう患者が大勢押しかけ、調剤してもらうのに半日かかるような状況であった。黄色エリアで治療した患者が、治療終了後に待たずに薬を処方してもらうためには、治療を受けている間に処方箋を薬局に届ける必要があり、そのためには看護師が現場を離れ、薬局に届けなければならなかった。平時であれば、患者を家に送り届けてから薬ができあがる頃にゆっくり薬を取りに来てくださいというところだが、ガソリンも手に入らない状況で、そのようなことをお願いできるはずがない。現場を離れてでも一早く処方箋を薬局に届け、薬を調剤してもらわなければならなかった。

2) Prescribing medications

In front of our pharmacy department, a large number of patients who wanted their medications to be prescribed had been gathering, and it took half a day for their medications to be prescribed and dispensed. In order to get their medications without waiting after treatment, patients who were treated in the Yellow Area needed to take their prescription to the pharmacy department while they were treated. For that purpose, some nurses had to leave their post and take prescriptions to the pharmacy department. In a normal situation, we could have asked for the patients to go back home and come back later to receive medications when they are ready. However, we could not ask them in a situation where gasoline couldn't be obtained. Even if we left our post, we had to take prescriptions to the pharmacy department without delay and have their medications dispensed.



患者でごったがえす薬局前

In front of the pharmacy department, where there was a throng of patients

3) 栄養

黄色エリアは受け入れる患者の性質上、院内での滞在時間が長く、患者の食事についても看護師が考えなければならなかった。しかしどこからも食料の提供はなく、結局患者に与えることができたのは水道の水だけであった。

3) Nutrition

Due to the characteristics of patients we had accepted in the Yellow Area, their stay in the hospital was lengthy, and the nurses had to also consider the patients' diets. However, there was no provision of food from anywhere, and we ended up giving them nothing but tap water.

4) 衛生

ライフラインが停止したため黄色エリアに設置されているトイレも使用不可能になってしまった。しかし仕方なく使用する場合もあり、いつの間にかトイレは不衛生な状況となっていた。

4) Hygiene

Due to the shutoff of the utilities, toilets located in the Yellow Area became unavailable. However, there were times where there was no choice but to use toilets, so the toilets became unsanitary before we knew it.

(5) 帰路

今回の震災で業務に影響を及ぼしたことの一つに、交通手段が確保できなかったことがある。ガソリンが手に入らなかったこと、電話が使えなかったことがこれを困難にした。救急車で患者が運ばれてきても全ての患者が重傷で入院が必要とは限らない。外来で軽快し帰宅となる患者は多くいる。普段の診療であればその後の帰宅方法まで考えないのであるが、今回はそうはいかなかった。公共の交通機関も被害のため麻痺している状態であり、また家族に連絡して迎えにきてもらいたくても、電話がつながらず、さらに家族が存在するかさえもわからない状態であった。結局、帰る当てが見つからない患者には、近くの避難所に行ってもらい、その後、交通手段を確保できる状態になったら自宅へ帰宅してもらうという方法をとるしかなかった。

(5) Their way home

One of the impacts that affected our work around the recent earthquake disaster was that we could not ensure transport means. Gasoline was unavailable and the telephone dilemma made the situation more difficult. Even when patients were transported to the hospital by ambulance, not all patients were seriously injured and weren't required hospitalization. Many patients got better in the outpatient clinics and could go home. In an ordinary situation, we never had to consider how patients would get home, but this time, that was not the case. The public transport had also been stopped due to damage; even if patients wanted to communicate with their family and had a family member come to pick up them, we had a bad telephone connection, and, to make the matters worse, they had no way of knowing whether their family members were alive or not. We could only take the following method; for patients having no means to return home, we had them go to a shelter nearby then once they secured their means of transport, they could return home.

(6) 看護師の勤務体制

病院が災害医療体制を配備したことにより、外来看護師も夜勤をすることになった。震災当日は帰宅する手段がなかったこと、またどのくらいの患者が搬送されてくるかわからず帰宅することが躊躇されたことなどから、ほとんどの看護師は病院へ留まった。震災翌日からは津波で家が流されて帰る場所がなくなってしまった看護師や、車が津波に流され通勤手段を失った看護師が主に夜勤に就いた。非常時の勤務の時間は明確にされていたものがなく、外来師長の判断に委ねられた。2 交替で行うのか、3 交替で行うのかさえ決まらなかった。当日年次休暇中の看護師は自宅が遠方であり、津波による道路の遮断で病院へ来ることができず、電話もつながらないため、連絡することができなかった。

(6) The work system of the nurses

Because the hospital had set a disaster medical system, a decision was made that the nurses of outpatient clinics also had to do night duties. This was mainly because we had no way to go home on the day of the earthquake and did not know how many patients would be transferred to our hospital, making us hesitant to go home. Most of the nurses remained in the hospital. Since the following day of the earthquake disaster,

nurses having no place to return as their housing was destroyed by the tsunami. Other nurses having lost their way of commuting due to their car having been swept away by the tsunami were mainly doing night duties. The working hours during emergencies had not been defined clearly and were left to the judgment of the head nurse of the outpatient clinic department. We even had had no rule whether we were to work on a two- or three-shift system. The houses of some nurses who were on an annual paid leave were in distant places and they could not come to the hospital because of their commuting roads were blocked by the tsunami. We also had a bad telephone connection. So we could not contact them.

緑エリアの状況

(外科系外来 基礎データ)

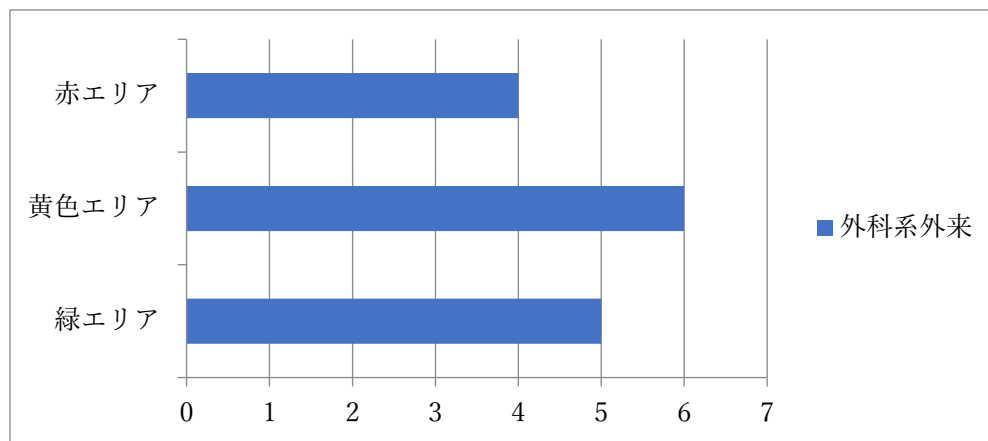
① 各外来の看護師の人数および患者の人数

	外科	眼科	脳外科	耳鼻科	泌尿器科	産婦人科	整形外科	皮膚科
患者人数	3	2	2	0	0	1	1	4
看護師人数	5	3	2	2	3	1	2	0 (1)

看護師 15 名とパート 3 名、地震直後につけつけた看護師 1 名、計 19 名

② 物損被害状況 無

③ 外科系外来看護師の各エリアへの振り分け



外科系外来は各エリアに分かれたので緑エリア中心に報告する。

The situation of the Green Area

(The basic data of the outpatient surgery group)

1) The number of nurses and patients in each outpatient clinic

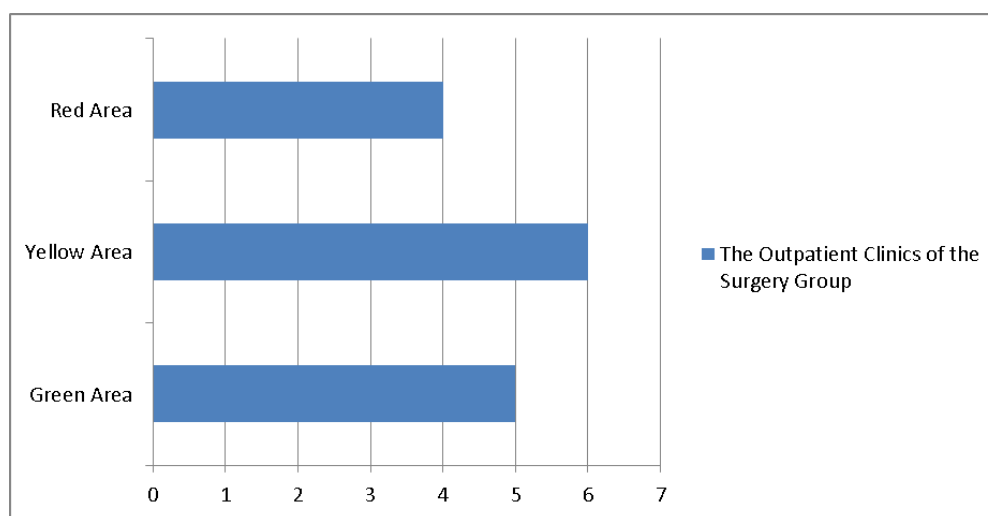
	Surgery	Ophthal-	Brain	Otolaryn	Urol-	Obstetrics	Ortho-	Dermatol-
--	---------	----------	-------	----------	-------	------------	--------	-----------

		mology	surgery	-gology	ogy	and Gynecology	pedics	ogy
No. of Patients	3	2	2	0	0	1	1	4
No. of Nurses	5	3	2	2	3	1	2	0 (1)

15 nurses, 3 part-timers and one nurse having rushed to the hospital immediately after the earthquake, 19 workers in total

2) The damage situation: Nothing

3) The assignment of nurses of the surgery group to each area



We will report the situation mainly on the Green Area as the nurses of the surgery group in the outpatient clinics were assigned to each area.

3月11日14時46分

外来待合ホールのテレビから緊急速報の警戒音が鳴った瞬間、大きく長い揺れが起こり、すぐに停電、自家発電が作動した。揺れが収まると同時に外来看護師は各患者の安全確保、点滴の抜針、検査の中断、帰宅に対する行動指示などを行った。同時に建物の被害状況を確認し、総務部・看護部長へ状況報告を行った。また、非常口の開放、避難経路確保、各外来に設置してある非常持ち出し物品の準備、空いているバケツ・ゴミ箱を利用し水の確保、トイレに使用禁止の貼り紙、簡易トイレの設置を行った。

14:46, March 11

In the moments when the warning of an emergency report sounded from a television in the waiting hall of our outpatient clinics, the big and lengthy shaking occurred, the electricity soon failed and the in-house power generation started. The nurses of outpatient clinics carried out tasks for each patient such as safety confirmation, the

withdrawal of infusion needles, the interruption of medical examinations or the giving instructions about returning home after the shaking subsided. At the same time, we checked the state of damage of the building and reported the situation to the General Affairs Department and the director of nursing. In addition, we opened emergency exits, secured evacuation routes, prepared emergency articles to take out that had been kept in every outpatient clinic, made use of vacant buckets and garbage boxes to reserve water, put up 'Unavailable' signs on the doors of toilets and installed portable toilets.



緑エリア 津波到達前に受け入れ準備が整っている様子

The Green Area: The appearance of [the outpatient clinics] where patient acceptance was ready before the arrival of the tsunami

初動体制

災害体制のために外来看護師に召集がかかり、師長の指示或いは自主的に各トリアージエリアに分かれた。緑エリアでは簡易ベッド設置、リネン・医薬品・物品（衛生材料・処置車・点滴スタンド・血圧計・机・椅子・廃棄処理物品）など、必要と考えられた物を、各々の看護師が勤務している外来から持ち寄り、処置等の患者の受け入れ準備を津波到達前に整えた。

The system of initial responses

The outpatient nurses were called to establish the disaster system and went to each triage area either by the instruction of the chief nurse or independently. In the Green Triage Area, beds were installed and each nurse brought in what they thought would be required such as linen, medication and goods (hygiene materials, treatment carts, infusion stands, manometers, desks, chairs, goods for waste disposal) from the outpatient clinics where each nurse was working. Before the tsunami reached, we



常に泥などで汚れていた緑エリアを、患者が少なくなった時間に清掃する様子

The situation of the Green Area, which was always dirty, mostly with mud. We cleaned during the periods of time where there were few patients.

completed preparation for the acceptance of patients to be treated.

地震発生から3日間の緑エリアの状況

患者は着のみ着のままで津波に巻き込まれ、ほとんどの人が全身ずぶぬれで来院した。すべてを失った患者は着る物も履物もなかった。私たちは、病衣や自宅に帰れたスタッフが持参した衣類を、患者に着用させた。サンダルを貸し出したが、サンダルはすぐになくなってしまった。緑エリアには、打撲や挫傷、ガラスやクギによる切創や刺創、風邪症状や喘息、胃腸のトラブルの患者が多かった。また、かかりつけ医を問わず多くの慢性疾患患者が、降圧剤やインスリンやストマ用品などを求めて来院し、患者のみならず、家族の消息を尋ねる人や避難者でごった返した。来院者は津波がもたらした泥の中を歩いて来院し、院内入口近辺の緑エリアは常に泥で汚れた状態となった。患者の少なくなった時間帯に箒やモップを使用し、掃除を行い衛生環境が整うように行動した。

The situation of the Green Area for three days after the earthquake

Patients had been swallowed up in the tsunami in their clothes, and most patients came to the hospital with their body completely drenched. Patients who had lost everything had no clothes and shoes. We had those patients put on hospital gowns and clothes, which some staff members who had been able to return home had brought. We lent sandals, which soon ran out. In the Green Area, there were many patients with blows or bruises, cut wounds or swab wounds caused by nails or pieces of glass, cold symptoms, asthma, and gastrointestinal troubles. In addition, many patients with chronic diseases were coming in, irrespective of their regular physician, to our hospital to ask for things such as antihypertensive agents, insulin preparations or stoma supplies, and the area became crowded with not only patients but also people visiting the hospital in search of the whereabouts of their family members and other evacuees. Those visitors came on foot through mud that the tsunami had carried, which made the Green Area near the entrance of the hospital always dirty. During the periods when the number of patients were few, we cleaned with brooms and mops so that we would provide a hygienic environment.

帰宅困難者

救急車や自衛隊が現場や避難所から被災者を搬送してきても、帰る場所も帰る手段もない患者も多かった。私たちは、救急車が到着するたびに隊員に何処に帰るのか聞き、同じ方向の避難所に帰りたい人を同乗させてもらえるように調整した。帰宅できない人は食事もないまま、新館エレベーターホールや看護学校、リハビリ室などに一時待機となり仮の避難所として調整した。

People having trouble returning home

Even though ambulances and the Self Defense Forces had transported victims from many situations and shelters, a lot of patients had both no place to go back to and no

means to return. Every time an ambulance arrived, we asked ambulance staff where they were heading and made adjustments so that they were able to transfer people who wanted to go to their shelters located in the same directions as the ambulance was heading. People who could not return home remained without meals and were made to wait temporarily in some places such as the elevator halls in the new building, the nursing school or the rehabilitation room. We adjusted those places as temporal shelters.

3 月 15 日から 3 月 22 日まで

この時期になると、薬の再処方、点滴、処置の再来の患者が多くなった。その都度新しいタグが使用されるため、前回の採血データやレントゲン写真を探し出せず、把握が困難となり継続した治療がスムーズに行えないこともあった。再診が予定されている患者については患者情報を記載し申し送りを行って情報の共有を図った。3 月 16 日から薬処方の専用受付を設けて対応することで、緑エリアの混雑はかなり解消された。また、整形、皮膚科、小児科など一部専門科については、エリア内に診察できる各ブースを設置し、一般外来移行の準備を行った。

11 日間でトリアージされた患者は 1918 名に及び、その約 7 割が緑エリアに集中、全体での処方箋の発行は 5751 枚に達した。

From March 15 to March 22

During this period, the number of patients who were revisiting the hospital in order to get medication, be put on infusion and receive treatment had increased. As new tags were used on each occasion, we could not find out their last blood sampling data and X-ray films, so our understanding of the patient's circumstances became difficult, and we could not carry out continuous treatment smoothly in certain cases. In regard to patients who were going to have their follow-up examination, we described their details, reported and tried to share them. On March 16, a reception desk only for issuing prescriptions was set up and started to respond to the demand, which considerably lessened the crowdedness of the Green Area. In addition, for some specialized departments such as orthopedics, dermatology and pediatrics, we set up each clinic's booth, in the area at which examination could be carried out, and then we prepared to switch to the system of our ordinary outpatient clinics.

The number of patients having triaged during those 11 days amounted to 1918, about 70% of which had been concentrating in the Green Area, and the number of prescriptions having been issued amounted to 5751 in total.

まとめ

今回の震災では、繰り返し行ってきた勉強会が役に立ち、災害体制のイメージができていたので、初動は迅速に行えた。スタッフからのアンケートの結果でも、トリアージタッ

グの記載の仕方、重症度別の対応のイメージができ、スムーズに動けたと答えた人が大半だった。しかし、災害医療体制が11日間も続いたことで、勤務シフト、連絡手段、トリアージタグの使い方が問題点として浮かび上がった。

Summary

In this earthquake, the study sessions that we had repeatedly held helped a lot, enabling us to picture the system during a disaster, so our initial responses were done quickly. In the result of the questionnaire survey of our members, the majority of them answered that they were able to approach how to write on a triage tag and how to respond to injuries and diseases of each degree of severity, enabling them to work smoothly. However, since the medical system of the disaster continued for 11 days, work shifts, communication means and the usage of the triage tags emerged as our issues.

① 勤務シフト

毎朝、明るくなると自衛隊のヘリコプターの音とともに患者が来院し、日没とともに患者の数が減る状況が続き、患者の流れにあわせて2交替や3交替と変則勤務が続いた。赤、黄色エリアは師長が責任者となり勤務調整されていたが、緑エリアは責任者の存在が不明確でリーダーの存在が重要であることを痛感した。災害時の勤務体制の調整を行うコーディネーターが必要だろう。

1) Work shifts

Every morning, the sun rose along with the sound of the helicopters of the Self Defense Forces and the arrival of patients to the hospital. The number of patients decreased along with sunset. This situation continued. Irregular work shift systems such as a two-shift system or a three-shift system continued consistent with the flow of patients. In the Red and Yellow Area, the head nurse of the Outpatient Clinic Group took responsibility, and our work shifts were adjusted. However, the person in charge of the Green Area was unclear, and we keenly realized that the presence of a person in charge was important. Coordinators for adjusting the system of disasters would be necessary.

② 連絡手段の確保

地震発生後から通信網が遮断されたことで、後方支援病院や周辺地域と連絡できない状況に陥った。アンケート結果からは、職員同士の連絡方法や病院に駆けつけられないときの対応をどのようにしたらいいかなどの不安があげられ、外来スタッフ間での連絡網の整備や手段を早急に考えなければならない。

2) Ensuring the contact means

As the communication network was cut off since the earthquake, we fell into a situation where we could not communicate with our backup hospitals and the

surrounding areas. From the result of our questionnaire survey, our staff expressed their anxiety about the contact means among ourselves, our response to a situation where we could not quickly get to the hospital among other things. We need to consider the maintenance and development of the contact network in the outpatient staff as soon as possible.

③ トリアージタグ

当初は入口が数か所になり、患者人数の把握や管理が困難であった。また検査伝票、検査データ、処方箋などをホチキスで留めるという使用法にしたことで、伝票類の管理までタグで行わなければならなかった。いつまでトリアージタグを使用すればいいのか、カルテへの切り替えの見極めも必要であった。また、コストを含め簡易カルテのあり方の検討も必要と考えられた。

3) Triage Tags

At the beginning, people could enter the hospital from several entrances. With difficulty we managed to grasp the number of patients and manage them. We switched the usage of triage tags by stapling several slips including inspection slips, inspection data slips and prescriptions, making us have to carry out the management of slips. It was also necessary to evaluate until when we have to use the tags and when we should switch the tag system to the original medical record system. In addition, we thought it necessary to consider what a simple medical record system including medical costs should be.

今後の課題

- ・勤務体制の調整をするコーディネーターの必要性
- ・連絡手段の確保
- ・トリアージタグ使用法の周知徹底
- ・簡易カルテ導入の検討
- ・災害マニュアルの見直しと周知徹底
- ・災害医療の勉強会の継続

Our challenges for the future

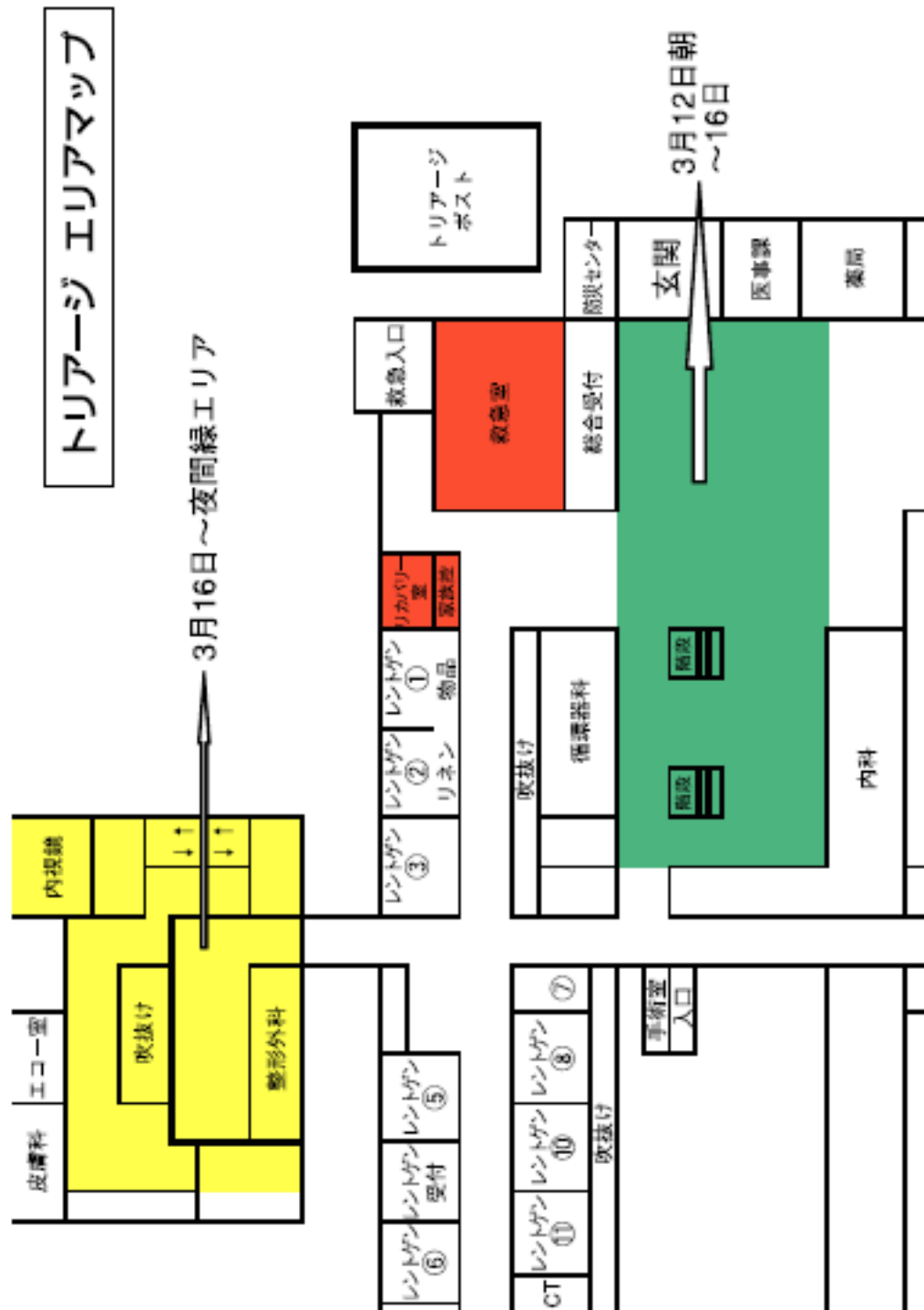
- ・ The necessity of coordinators for the adjustment of our work shifts
- ・ Ensuring communication means
- ・ The usage of the triage tags
- ・ Considering the introduction of a simple medical record system
- ・ Reviewing the disaster manual and thoroughly educating the staff on it
- ・ Continued study sessions of disaster medical care

おわりに

災害が発生したとき「大変なことが起きている」と感じたが、自分たちが未曾有の災害の渦中にいる事など思ってもいなかった。とにかく自分たちにできる事をしようと一人一人が臨んだ。不眠不休の連続と空腹のなかで心身ともに極限状態になっていたが、看護に対する真摯な姿勢で、患者の不安や恐れを払拭する優しい笑顔で接していた。身体的、精神的にまいってしまいそうになることも多々あったが、慣れ親しんだスタッフと寝食を共にし、また、多くの方々に支えられたからこそ乗り越えることができたと確信している。

In conclusion

When the disaster occurred, we felt that extraordinary events were happening, but we never even thought that we ourselves would be in the midst of an unprecedented disaster. Each of us stepped up and tried our best. Although we were in an extreme mental and physical state because of the continuous workload without sleep, rest as well as being starved, in an earnest manner of nursing we were attending to many patients with a gentle smile which might relieve their anxiety and fear. In many cases, we were almost at almost at the end of our ropes, exhausted physically and mentally, but we lived under the same roof as the staff we had become familiar with and we were supported by many people, which we are sure is why we were able to overcome all the difficulties.



	災害状況	院内の動き	救急室内の状況（施設など）	救急室スタッフの動き	救急室内の患者状況
3/11(金) 14:46	地震発生 (M9.0 震度6強) 大津波警報発令 市内一斉避難 院内車の乗降停止 ガラスは破損多数	<ul style="list-style-type: none"> 院内停電・自衛隊作動 エレベーター 避難停止 トリアージポスト設置 (救急車入口付近) 簡易テント設置 救急車入口段差発見 	<ul style="list-style-type: none"> 物品落下（本棚のファイルなど） 自衛隊員にて電源確保 水道使用可能 オーダリング使用不能 電話外線・PHS使用可能 段差に警備の板でスロープ作成 	日勤者8名（うち1名休憩中・1名午後 休日で自宅へ） <ul style="list-style-type: none"> リネン確保のため洗濯室へ連絡 物品運搬のため物品整理へ連絡 	患者0名 <ul style="list-style-type: none"> 地震直後、断部の整形外科1名 とびこみで来院→シーネ固定で 帰宅
15:00	大津波警報発令にて 院内に付近住居が多数 避難してくる 震度5強前後の余震	<ul style="list-style-type: none"> 避難者の誘導 内科ホールにて外来Na 診し合い（内科ホールの 天井落下の恐れあり） ↓	<ul style="list-style-type: none"> 医師が各々診察 検査室より採血は緊急セット のみ レントゲンよりCT・X-P最低 限で 	<ul style="list-style-type: none"> 準夜勤Na2名出勤 日勤者1名帰宅 安否確認メール2名受信、その他2 名と連絡とれず 水の確保（調理BOX利用し水確保） 洗濯室よりリネン搬入されレントグ ン室に収納・整理する 	<ul style="list-style-type: none"> 志津川救急隊より妊婦受入要請
15:20	病院下まで津波到達 	院内の設置エリアのレイア ウト決定 廊→皮膚科外来前廊下 廊→整形外科外来前廊下 廊→感染症科 地下や4階入口などより患 者が来院してくる トリアージポスト変更	赤→救急室	<ul style="list-style-type: none"> 赤（重症処置エリアの設置準備） 物品・薬品が搬入される 点滴セットを組む ガーゼなど衛生材料確保 食糧・飲料を売店より調達 ストレッチャーを指図門より確保 	<ul style="list-style-type: none"> 自宅にて呼吸器装着の小児の受 入要請（搬上）
16:00	雪が降ってくる	地下ボイラー室前と4北井 原口に臨時ポスト設置	<ul style="list-style-type: none"> 4北とボイラー室前に1名づ つ医師派遣 各エリアに医師が分散 	<ul style="list-style-type: none"> 救急Na2名ボイラー室前のトリ アージポストへ移動、タグ記入・患 者移動介助など 施設移動のため担架移送をレントグ ン・ザールスタッフに依頼 低体温・肺炎の重症患者処置 	<ul style="list-style-type: none"> ボイラー室前より10歳名の患 者がポンプ室などで来院（低体 温・打撲30分以上が腕・顔工 リアへ） 志津川よりの妊婦は、抱架にて 3階婦人科外来へ
17:00	病院下の津波引ける	正統のトリアージポストよ り患者受入可能となる		<ul style="list-style-type: none"> 消防に正統のトリアージポストより 救急車受入可能と連絡 	
18:00	能折地区で火災発生	<ul style="list-style-type: none"> 外線電話不通 PHS不通 	<ul style="list-style-type: none"> 消防の電話不通 内線電話のみ使用可 	<ul style="list-style-type: none"> 救急スタッフ6名と外科系外来Na3 名で重症患者処置対応 	<ul style="list-style-type: none"> 水漏し、泥だらけの低体温患者多数 VF・呼吸停止で待機する患者など

					<ul style="list-style-type: none"> 連絡なしの救急車や患者が次々来院 市田病院・鶴岡毛布にてベットを確保 多量の増援の加温をザールに依頼 交替で食事 	<ul style="list-style-type: none"> 黒エリアの入口分かつずCPAの患者も搬入される 在宅療養の患者→周 不安な妊婦→直接婦人科外来
20:00		市長会議（シフト等…）			<ul style="list-style-type: none"> 交代勤務（2チーム構成、交替で休憩・夜間） 医師もA～Fチーム構成（2時間交代） 	<ul style="list-style-type: none"> 以後夜間は、10～20名程度の患者来院。重症度は、黄・緑程度。 予想より患者数は、少ない
21:00	余震多発 気温低下 火災警報				<ul style="list-style-type: none"> 交代勤務（2チーム構成、交替で休憩・夜間） 医師もA～Fチーム構成（2時間交代） 	<ul style="list-style-type: none"> 以後夜間は、10～20名程度の患者来院。重症度は、黄・緑程度。 予想より患者数は、少ない
3/12日 8:10	ニュース報道にて津波による家屋全壊 流出多数 火災で被災家屋多数	<ul style="list-style-type: none"> 早朝台断線停電 大きいテントでトリアージボスト両設置 	<ul style="list-style-type: none"> 志津川・本吉病院が水没 	<ul style="list-style-type: none"> 志津川・本吉病院の水没により 知仙沼・南三陸町全域の患者が 多数当院に収容されることが予想される 不安な妊婦の来院多く1階のリハビリ室に収容する 在宅療養の患者の電話・検薬の確保のために日3西幹線を使用 	<ul style="list-style-type: none"> 医師・Ns共に交用勤務継続 室内の床が泥や油で汚染がひどく患者がいない時に適宜モップで清掃する 救急スタッフ2名到着 検具・検衣など不足し病棟から引き集める 	<ul style="list-style-type: none"> 明るくなり歩行できる患者多数来院 不安な妊婦達の来院さらに増える 明るくなり発見された低体温患者が多数 救急車搬送数増加 電話が不通にて救急搬送患者の状況や搬入時間も不詳のまま受け入
10:00		<ul style="list-style-type: none"> 安全確認後エリア変更 黒エリア→内科ホール 黄エリア→皮膚科・整形外科外来前 		<ul style="list-style-type: none"> 救急スタッフ1名到着 トリアージを離れ、黒エリアの処置に専念できるようにする 黄・黒エリアへの移送も救急Nsが行っていたが事務スタッフに委任する 加温乾燥が多量に必要なためウイオの保温BOXを利用常時保温できるようにする 	<ul style="list-style-type: none"> 救急スタッフ2名到着 検具・検衣など不足し病棟から引き集める 	<ul style="list-style-type: none"> 救急車搬送数増加 電話が不通にて救急搬送患者の状況や搬入時間も不詳のまま受け入
13:00		<ul style="list-style-type: none"> 若手D-MAT到着 トリアージ担当 病院入口にリハビリや事務のスタッフが救急と一般患者の誘導を行う 		<ul style="list-style-type: none"> 救急スタッフ1名到着 トリアージを離れ、黒エリアの処置に専念できるようにする 黄・黒エリアへの移送も救急Nsが行っていたが事務スタッフに委任する 加温乾燥が多量に必要なためウイオの保温BOXを利用常時保温できるようにする 	<ul style="list-style-type: none"> 救急スタッフ2名到着 検具・検衣など不足し病棟から引き集める 	<ul style="list-style-type: none"> 救急車搬送数増加 電話が不通にて救急搬送患者の状況や搬入時間も不詳のまま受け入
3/13日	余震多発	<ul style="list-style-type: none"> 東京D-MAT来院 製品入荷 黒のみの受付もタグを使用し、患者が多数来院し院内混乱する 		<ul style="list-style-type: none"> D-MATはトリアージ担当 市内の救急車では搬送できない患者をD-MATが搬送してくる 日新館の車でも多数患者が搬送される 	<ul style="list-style-type: none"> 夜夜…救急Ns5名・外科系外来Ns1名 深夜帯に各エリアの勤務が狭いため赤エリアにて全ての診療を行ったため重症・軽症入り混れ部発生きたす 日中になり脱離のシフトが3ヶ所に分散D-MATのトリアージ直後の移動中にまたトリアージし直すなど混乱することもあった 	<ul style="list-style-type: none"> 低体温・AMI・気胸・CPAなど重症者増加する 患者数 深夜10名 入院2名 (VT・熱傷・脱水・低体温・線維腫瘍) 日勤24名 入院5名 (AMI・骨折・気胸・CPA・肺炎など) 午後10名 入院5名 (同型アロックス・C1・高山病・夜間)

	災害状況	院内の動き	救急室内の状況（施設など）	救急室スタッフの動き	救急室内の患者状況
3/14(月)		<ul style="list-style-type: none"> ●災害時体制について緊急連絡が回る ●外来診療休止、全ての患者はトリアージ対応 ●薬品入荷予定 ●タグの在庫不足にて薬処方のみの場合はタグなしで行う 	災害初期に準備した物品も減少するが、物品倉庫のスタッフが適宜在庫チェックし補充する	深夜…救急Ns3名 日勤…救急Ns3名・外科系外来Ns2名 準夜…救急Ns3名・外科系外来Ns1名 ●重症患者の看護や処置など以外にも帰宅患者の移動・連絡手段がないため戻る救急車に乗りせたり役所や避難所に連絡する等の手続きにおわれる	患者数 深夜7名 入院0名 (低血糖・頭痛・発熱・処方希望) 日勤7名 入院4名 (意識障害・打撲・肺炎・高血糖) 準夜9名 入院3名 (吐血・陣痛・喘息・胸部苦痛)
20:00	南気仙沼駅付近で火災発生				
3/15(火)	火災が気仙沼市ガスタンク付近まで延焼	<ul style="list-style-type: none"> ●市ガス爆発の危険あり病院退避を検討 ●入院患者の搬送検討 	<ul style="list-style-type: none"> ●休憩中の医師・Nsを救急室に緊急召集 	<ul style="list-style-type: none"> ●緊急召集にて変則勤務に変更 ●避難準備（食糧や持ち出し薬品など） 	VT・PSVT・肺炎・陣痛・発熱などの患者がいたが入院・帰宅をさせ搬送患者の待機場所を確保する
5:00		●自家発点検のため停電			<ul style="list-style-type: none"> ●パンペリ等重症患者を搬送まで救急室に収容する
6:00		●重症者10名搬送決定			<ul style="list-style-type: none"> ●車内鎮静使用による一酸化炭素中毒や虫垂炎疑いの患者収容
8:00		●ヘリ搬送開始			<ul style="list-style-type: none"> ●搬送患者と来院患者で救急室内がごった返す
13:30頃	福島原子力発電所爆発	<ul style="list-style-type: none"> ●原発の関係で大気が不安定のためヘリ搬送見合わせ検討 	<ul style="list-style-type: none"> ●搬送不透明の状況で妊婦など搬送者選択に医師が苦悩 	<ul style="list-style-type: none"> ●搬送に関する連絡など各科からの電話対応 ●一酸化炭素中毒や虫垂炎などの患者の処置・入院の介助 	<ul style="list-style-type: none"> ●パニックの患者が収容されるが、三峰HPに搬送する
14:40		<ul style="list-style-type: none"> ●搬送再開決定 	●東北大の医師が応援にくる		深夜8名 入院2名 日勤6名 入院4名 準夜8名 入院3名
15:00		<ul style="list-style-type: none"> ●D-MATのヘリ4名 ●自衛隊機15名搬送 			
16:00		<ul style="list-style-type: none"> ●搬送再開 ●電気復旧 			
3/16(水)	<ul style="list-style-type: none"> ●市内の開業医が軽症者の一般診療を開始する ●au携帯復旧 	<ul style="list-style-type: none"> ●エレベーター復旧 ●内科ホール通常に戻す ●院外調剤薬局の薬剤師が応援体制に ●お湯がでる ●オートクレープ使用再開 		深夜…救急Ns2名 日勤…救急Ns3名・内科Ns2名・外科Ns1名 準夜…救急3名 ●再来院する患者がありその都度タグ使用のため以前の状況が把握できないなどの問題もあった	患者数 深夜3名 入院0名 (肺炎・CPA・浮腫) 日勤6名 入院1名 (意識低下・CO中毒・吐血) 準夜20名 入院4名 (転落外傷・心疾患・腹痛・ショック)

3/17(木)		<ul style="list-style-type: none"> 内服薬方が14日分処方可能となる 	<ul style="list-style-type: none"> トリアージポストが正面玄関に移動 黄・緑エリア継続し、経過観察の患者を収容する カルテまだ使用できずタグ使用 	<ul style="list-style-type: none"> 赤・黄・黄タグ患者を救急室にて初診・緊急経過観察など時間のかかる患者は黄エリアに移動する 救急車のトリアージは、救急Nsが進行 日中、外来やザールNsが応急処置 当直医長の勤務が再開 救急科の退院で勤務できず退院所にて救急活動していた救急スタッフが患者搬送に付き添ってくる 	救急所で発熱患者増加する 夜間科の患者が増加 深夜8名 入院0名 (打撲・骨折・急腹症・てんかん) 日勤10名 入院3名 (熱傷・低体温・呼吸停止・虫咬咬) 深夜16名 入院3名 (インフルエンザ・CPA・吐血・胃腸・肺炎)
---------	--	--	--	--	---

18日	運動できなかったNsが、勤務再開しスタッフ全員そろふ 日中、15歳以下の小児は小児科外来で診療 婦人科も婦人科外来で診療 救急科が事務受付場所になる レントゲンの①で緑エリアのNsが付き経症で来院した患者の診療をする 点滴など様子観察の患者は、黄エリアに移動する 精神科の応接室が来院する 消防のトリアージタグがなくなり、通常の搬送確認書になる	22日	涙血が緊急処置セット以外も使用可能 救急外来でのカルテ使用再開 黄・緑エリアでの診療終了
19日	埼玉県知事にお返しの派遣要請する DMATが患者を21名へリ搬送 透析患者が転院搬送される(日南側のバスにて東北大学病院→北海道) 内服薬が2週間分処方可能 介護タクシーが搬送再開となる 看護部全員の安否が確認される アメリカNGO医師が来院 医師 日勤：4名(外科2名・内科2名) 当直：3名	23日	乾燥機・洗濯機・給湯機が使用可能 埼玉のNsが応急処置に入る(各勤務所に3〜7名勤務し、診療介助や患者搬送などを行う)

災害当時の状況と最良の人工透析を目指した活動

透析センター

The Hemodialysis Department

The situation of the Hemodialysis Center during the time of the disaster and our activities aiming at providing the best hemodialysis

Hemodialysis Center

震災時透析診療体制

患者数 168 名（夜間透析 35 名） うち 60 歳以上 119 名
ベッド数 66 床
職員 医師 外科 4 名（他数名の応援あり） 泌尿器 3 名
看護師 22 名 看護補助員 1 名

職員被害状況

家屋損壊 6 名 二親等以内死亡及び行方不明 7 名（看護師・看護補助員）

The system of the medical care of hemodialysis center at the earthquake disaster

The number of patients: 168 (35 in the evening-time dialysis) including 119 at the age of 60 or more

The number of beds: 66

The number of staff members:

4 surgeons (with the support of several other doctors)

3 doctors of urology

22 nurses

1 nursing assistant

The damage situation of our staff:

The number of staff members whose houses had been damaged: 6

The number of staff members (the nurses and nursing assistants) whose relatives within the second degree had passed away or were still missing: 7

■ 平成 23 年 3 月 11 日

災害時 66 台の透析機監視装置、透析液供給装置は無事だった。外来 3 名と入院 1 名が透析中で透析監視装置の警報がなり透析停止、地震がおさまってから返血した。透析センターには患者が約 30 人と、スタッフは準夜勤務も含めほぼ全員がいた。看護師長から透析室内の患者を 3 階病棟の待合室に避難させるように指示があり、歩行できる者は階段で移動し、歩行困難の者は担架で運んだ。それから各病棟の応援に行き、災害対策本部設置のテントや機材を運んだ。透析室は、自家発電に切り替わっていたが、停電と余震の為その日の夜間透析は中止となり、帰宅を希望した者には「明日透析ができるかわからないが、連絡方法がないので病院に来てください」と話し約 20 名の患者が帰宅した。その後帰宅途中の夜間透析患者が 2 名低体温で運ばれ、すぐに保温を兼ねて透析を始めた。21 時頃から帰宅困難で透析室に残っていた夜間透析 7 名と日中透析ができなかった入院 2 名の透析を 3 時間行った。その頃には、看護師は全員無事揃っていた。終了したのは、24 時 30 分であった。

■ March 11, 2011

At the time of the disaster, 66 dialysis monitoring devices and dialysate supply devices were not affected. Three outpatients and one inpatient were receiving dialysis when the alarms of the dialysis monitoring devices rang. We stopped dialysis and returned the blood back into their vein after the earthquake subsided. At the Dialysis Center, there were about 30 patients and almost all of the staff including late shift workers. Our head nurse gave instructions to evacuate patients at the Dialysis Center to the waiting room of the ward on the 3rd floor; those who were able to walk went via the stairs, and the others who could not be transported by stretcher. We then went to the hospital wards to help, some of us carried tents and equipment to set up the Emergency Response Headquarters. The power supply of the Dialysis Center had been switched over to in-house power generation, but the night-time dialysis of that day was canceled due to power outages and aftershocks. We said to patients who hoped to go home, “We are not sure if we can carry out dialysis tomorrow and have no way of communicating. So, could you please come in to the hospital?” About 20 patients went home. After that, two patients of the evening dialysis on their way home were transferred to the hospital due to hypothermia, and we soon started hemodialysis, which also helped the patients warm up. We carried out 3-hour dialysis’ starting from about 21 o’clock for 7 patients for evening dialysis, who had been staying in the hospital as they had difficulties in getting home, and 2 inpatients, who had not been able to get hemodialysis. By that time, all the nurses had safely gathered to the Dialysis Center. It was at 00:30 when we finished our duties.

家族の安否を心配するスタッフに、無理しないよう話し、帰宅を許可した。

We told staff members who were worrying about the safety of their family not to push themselves too hard, and they were allowed to return home.

■ 黒タッグ

震災当日 18 時から、透析室の看護師は隣接する感染病棟でのトリアージ、黒タッグ担当を指示された。医師から必要物品を指示され準備に追われた。

■ Black Tag

From 18:00 on the day of the earthquake, the nurses of the Dialysis Center were directed to triage patients in the Infection Ward adjacent to the center and to take charge of the Black Tag Area. Our doctors indicated necessary articles, and we forced ourselves to prepare them.

問題になった事は、死亡診断書をどこで、誰が書くのかということが不明で収容時混乱した。連れて帰りたくても帰る場所がない、と家族に泣き崩れながら訴えられても説明できない私たちは、ただ頭をさげ謝ることしかできなかった。

What became a problem was that it was not clear where and who wrote the death certificates, and we were unsure when we accommodated patients. Even though their families protested while bursting into tears, that they wanted to take the patients home but had no place to return, we were unable to give any sort of explanation, and all we could do was bow and apologize.

■ 3 月 12 日

3 月 12 日は 79 名の当院患者と陸前高田市、南三陸町、大船渡市の被災した施設の患者の支援透析を行った。午前 7 時前には患者が来院していた。医師の指示で、従来の 3 分の 2 に縮小した 40 台の機械で、全員同一のダイアライザー（透析装置）を使用し通常の半分の 2 時間透析を行った。その短い時間内でできる限りの体調管理の指導をした。薬の処方や、被災した患者の対応や他施設からの患者受け入れ等の業務が増え、勤務可能な看護師で通常業務以上の役割を負った。この時、ガソリン不足は深刻でスタッフの通勤や患者の通院方法は大きな問題だった。約 1 週間来られなかった患者は 2 名おり、後日判明したが連絡方法がなく個人で避難透析していた患者が 3 名いた。

■ March 12

On March 12, we carried out hemodialysis for 79 patients of our hospital and supported hemodialysis for the patients of affected facilities in Rikuzentakata City, the Town of Minamisanriku and Ofunato City. Before 7:00 in the morning, patients had come and stayed. Listening to the directions of our doctors, we carried out 2-hour dialysis (half of the usual operating time) using 40 machines (two-thirds of the usual), using the same type of dialyzers for everyone. We taught them how to manage their physical condition as much as possible in that short period of time. Services such as

the prescription of medications, the management of affected patients and the acceptance of patients coming from other facilities were added to our duties, and the nurses who could work bore more responsibilities than usual. At this time, the gasoline shortage was serious, and getting to the hospital was a big problem for the staff and outpatients. There were two patients who had not been able to come to the hospital for about one week; we found out later that there were three patients with no means of communication who had evacuated individually and were getting hemodialysis.

3月13日の日曜日は、当院14名と他施設5名の透析を行った。その夜から避難所に行けない歩行困難な方と不穏が激しく病棟受け入れ困難な方、そして在宅酸素療法の呼吸器外来患者合計7名を、透析センターに預かり入院とした。その日から、私達は勤務シフトを変更して看護した。

On Sunday, March 13, we performed hemodialysis for 14 patients of our hospital and 5 patients of other facilities. From the night, our center accepted people who had difficulties getting to their shelter, those who were restless and an outpatient under home oxygen therapy of the respiratory outpatient clinic, 7 in total. Since that day, we were working by our changed work shifts.

3月14日からは当院と他施設の約170名の透析を行った。終了時間は19時頃であった。From March 14, we carried out hemodialysis of about 170 patients of our hospital and other facilities. The end time was around 19:00.

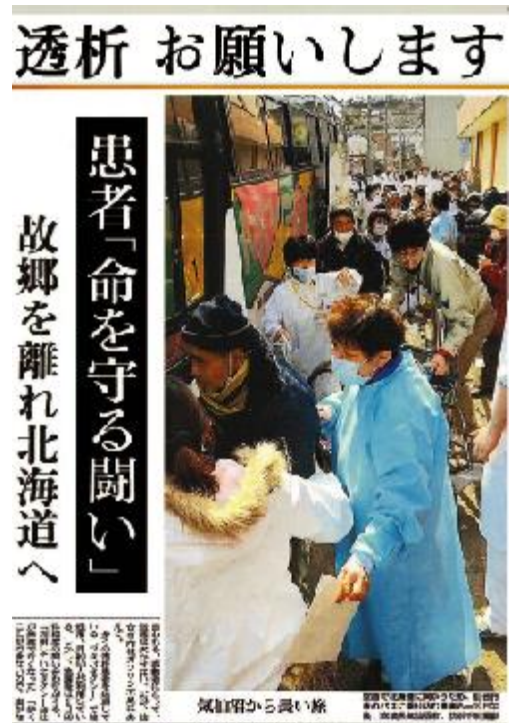
■93名の遠隔避難

病院には自家発電に必要な重油は数日分の確保しかなく、ダイアライザー等の透析に必要な資材も不足し、透析の維持が難しい状況となった。15日から院内で衛星電話が開通し県災害対策ネットワークを通して、東北大学病院のコーディネーターの先生に、他地域に避難透析の受け入れを調整していただいた。北海道には、松島基地から自衛隊の飛行機で移送が決まり、3月17日と18日の2日間で、医師は出来る限りの時間を使い、患者と家族に説明した。同意が得られたのは約80名。3月19日、病院からバスまでの約300メートルの距離を職員に付き添ってもらい歩いた。その後、千葉、秋田、山形など各地から避難透析の申し出がありお願いした。3月23日には松戸に8名（搬送途中で1名亡くなった）、4月13日には3名を秋田に、4月15日には3名を山形の病院に移送した。

■ Evacuating 93 patients to remote places

Heavy oil was needed for our in-house power generation, we had a reserved amount only for a few days in the hospital, the materials necessary for hemodialysis such as dialyzers were lacking, so it became difficult to continue hemodialysis. From March 15, a satellite phone became available, and we had the coordinator doctor of Tohoku University Hospital adjust the acceptance of hemodialysis patients to other hospitals after their evacuation to other remote areas through the Disaster Countermeasures Network of Miyagi Prefecture. It was determined that they were going to be transported from Matsushima Air Base to Hokkaido by an airplane of the Self Defense Force. Doctors explained this to the patients and their families in the limited time they had between March 17 and 18. The number of patients who agreed was about 80. On March 19, the patients walked the distance of about 300 meters from the hospital to buses accompanied by the staff members (see the photo on the right). Then, we had some proposals of ‘evacuation hemodialysis’ from various places such as Chiba, Akita and Yamagata Prefectures. We transported 8 patients (one of which died during transportation) to Matsudo in Chiba Prefecture on March 23, 3 patients to Akita on April 13 and 3 patients to a hospital in Yamagata on April 15.

2011 年 3 月 21 日『朝日新聞』
March 21, 2011, “Asahi Shimbun”



■他部署への応援と職員の休憩

気仙沼に残った患者が 70 名になってから私たちは、自主的に他部署へ応援にでた。病棟の看護師に少しの時間でも休んでほしいという思いからだ。

また、家を流された看護師は、泣きたい気持ちを抑えながら、瓦礫の中、在宅の健康調査のため街中を巡回した。

透析室は、埼玉県立病院の支援看護師や当院の帰宅困難な職員に、休憩室として提供した。埼玉の看護師皆さんは、透析のスタッフに温かい言葉をかけてくれ、同僚に言えない事をじっと聞いてくれた。休憩室として提供したことは、傍に応援してくれる人がいるという安心感があり、とても良かった。

■ Support to other departments and the repose of our staff

After the number of patients remaining in Kesennuma was 70, we went to support the other departments voluntarily. That was because we wanted the nurses of the wards to rest, even if for a short time.

Meanwhile, a nurse of our department whose house had been swept away by the tsunami, who'd been suppressing her feelings of wanting to cry, went around the rubble in the city to do a health survey of people staying at home.

The Dialysis Center provided a resting place for the support nurses of the Hospitals of Saitama Prefecture and the staff members of our hospital who could not return home. Thankfully, every nurse of Saitama Prefecture spoke to the staff members of the Dialysis Center warmly and listened patiently to what we had not been able to say to our coworkers. Providing them with a place to rest, we could feel a sense of security, because there were some people nearby who were cheering us on, making us comfortable.



■北海道から帰省

5月12～14日に東北大学病院から宮城県災害医療コーディネーターの医師1名、当院ドクター3名と透析スタッフ4名が北海道に退院調整に行った。患者の帰郷への強い思いと、医療状況が落ち着いてきたことで、5月26日約70名の患者を、民間の飛行機を使い気仙沼から院長はじめ事務、透析スタッフが大型バス2台で仙台空港に迎えに行った。

■ Homecoming from Hokkaido

From May 12 through 14, a coordinator doctor of the Miyagi Prefecture Disaster Medical Care from Tohoku University Hospital, 3 doctors of our hospital and 4 members of our Dialysis Center went to Hokkaido to adjust the discharge of the patients from some of the hospitals. As the patients had a strong desire to come back, and the medical situation in Kesennuma had calmed down, on May 26, our staff members including the director of our hospital, some clerks and some staff members of the Dialysis Center went to Sendai Airport in two large buses to accept about 70

patients coming back by a private airplane.

■ 今思うこと

震災当日からほとんどのスタッフが病院に残り、家族の安否や自宅がどうなっているのか分からない状況のまま働いた。次々に起こる経験のない問題にただ必死に取り組んだ。私達が何も食べないで働いている姿を見た患者が、ご飯と牛乳を差し入れしてくれた。本当にありがたかった。

■ What we are now thinking of

Most of the staff remained in the hospital and worked in a situation under which they could not guarantee the safety of their family or know the extent of damage done to their homes. We just desperately worked through the barrage of matters at hand that we had never experienced before. Some patients who had seen us working empty stomachs gave us cooked rice and milk. We were really grateful.



埼玉県立病院の支援看護師

The support nurses of the Saitama Prefectural Hospitals

黒タッグでは津波で濡れて泥だらけの方もおり、できる範囲でエンゼルケアを丁寧にさせて頂いた。こういう最後を看取る事に、看護師としての尊い役目を感じた。後日、葬儀会社も営業停止となりご遺体を連れて帰る手段も無く、市役所の係りの人が軽トラで安置所に移す手伝いをし、見送る時は本当に悲しい気持ちになった。

In the Black Tag Area, some patients were wet due to the tsunami and covered with mud; so we did End of Life care as carefully as we could. This type of caregiving made us feel how sacred a role of a nurse is. Later, funeral service companies also temporarily closed down, people had no means to take the corpses back, and we helped some public officials of the city hall transfer them to morgues. We felt incredible sadness when we saw them off.

北海道に避難した方々は、積極的に観光に出かけた人と、気仙沼が心配で何もする気持ちになれなかった人がいた。「初めは心配だったけど、北海道の皆さんからとても心温かい待遇を受け、安心して過ごせた。」との感謝の言葉と、「生まれた土地が一番いい、早く帰りたかった。気仙沼がどうなっているか分からなかった。」と不安も伝わってきた。残念ながら2人の患者が遠い北海道で亡くなったとの知らせが届いた時、みんなで泣いた。数か月後家族から、「行かせなければ良かったかなあ」と話された時、今回の避難が本当に良かったのだろうか？と考える。しかし、心不全、感染症、骨折が多く発症していることを考

えると、リスクを一番少なくし健康を守る最良の方法を選んだのだと確信している。

Among those patients who took refuge in Hokkaido, some actively went sightseeing, and others wanted to do nothing while worrying about Kesennuma. We received appreciative comments such as “We were worried at first, but we got such warmhearted treatment from those in Hokkaido that we were able to spend our time at ease” and the uneasy comments such as “The land of my birth is best”, “I wanted to go back early” and “We never knew what became of Kesennuma”. When we received the news of two patients unfortunately passing away in distant Hokkaido, all of us cried. When their families said to us a few months later, “We should not have had him/her go,” we wondered if the evacuation at the time was for the best or not. However, considering that a lot of heart failures, infections and fractures were occurring, we are sure that we chose the best way to minimize their risk to protect their health.

■今後の課題

今回の経験を生かし透析施設間の連携を構築し、通信方法や連絡方法の整備を進める。また、早急に透析センターの災害マニュアル見直しを行い、定期的に訓練する。そして、災害時患者指導の勉強会を開催することなどが課題である。

■ Our challenges for the future

Taking advantage of our experience, we should build a network among hemodialysis facilities and promote the development of communication and contact methods. Also, we should carefully review the disaster manual of the Dialysis Center again as soon as possible and practice it on a regular basis. Furthermore, we have other challenges such as holding study sessions on patient guidance at the time of disaster.



中央手術材料室が果たした役割を振り返る

中央手術材料室

The Central Operating Room

Looking back on the role played by the Central Room of Operations and Materials

The Central Room of Operations and Materials

はじめに

3月11日、宮城県沖を震源とする巨大地震が発生し、津波や火災を伴う未曾有の大災害となった。私達は手術に備えつつ、普段とは違う業務に戸惑いながらも、応援業務にあたった。想像を絶する毎日の中、医療従事者として、また一人の人間として様々な葛藤を抱きながら必死に動いた。

実際にどのような事を思い、行動していたか、ポストイットを用いて2週間の行動を調査し、災害医療における当中央手術材料室の役割を振り返った。

Introduction

On March 11, a great earthquake with an epicenter off the coast of Miyagi Prefecture became an unprecedentedly huge disaster accompanied by fires and tsunamis. While preparing for urgent surgeries while muddled with having to provide services we weren't used to, we took upon supporting services. Everyone was in an unimaginable situation every day and worked desperately despite a variety of conflicts not only as a health care worker but also on a human level.

Using Post-it®'s (post-it notes), we looked back on our activity for the two weeks in terms of what we thought and did during our duties of the Central Room of Operations and Materials in disaster medical care.

【震災時の状況】

勤務者・・・看護師長 1 名、副看護師長 2 名、看護師 8 名（休みだった 2 名は当日に合流）、看護助手 3 名

手術状況・・・整形外科（右橈骨遠位端骨折）骨接合術 1 件のみ

被害状況・・・一時的に停電になったが、すぐに自家発電に切り替わった
稼働中の高圧蒸気滅菌機が緊急停止し、滅菌物が取り出せなくなった
棚の手術器具等が多少落下した
壁の一部にひびが入った

[The situation at the earthquake disaster]

The staff on the job One chief nurse, 2 assistant chief nurses, 8 nurses (other 2 on leave came to join on the day) and 3 nursing assistants

The situation of our operation Only one surgery of osteosynthesis (the fracture of the distal edge of the right radius)

The situation of damage A power outage occurred temporarily, but power supply was switched to in-house power generation immediately.

Our high-pressure steam sterilizing machine made an emergent stop, and we could no longer take out sterilized instruments.

Some things on shelves such as surgical instruments fell down.

Some walls were partially cracked.

I. 震災当日の中央手術材料室

手術室 10 番では、整形外科入院患者の骨接合術が、局所麻酔下で行われていた。プレートが入り、スクリュー固定の途中で、経験したことのない大きな揺れを感じた。一旦手術を中断し、器械出し看護師は、創部にガーゼ・包帯を巻き、清潔保持のため器械台に圧布をかけ、動かないように押さえた。外回り看護師は、无影灯や透視の機器を患者から遠ざけ、ベッドを抑えると共に、患者の傍らから離れず声を掛け続けた。揺れが収まったのを機に手術を再開し、15 時 11 分終了となった。その他のスタッフは、被害状況の確認と、避難経路を確保するために、2 つの入り口の自動ドアを手動に切り替えた。また、ラジオをつけ情報収集を行った。

I. The Central Room of Operations and Materials on the day of the earthquake

In the 10th operating room, the osteosynthesis of an orthopedic inpatient was being performed under local anesthesia. During the operation, a plate was inserted and during the fixing of screws, we felt big shakes like we had never experienced before. The surgery was once interrupted, and a nurse who had been serving instruments put some pieces of gauze and a bandage on the wound, covered the table of surgical instruments with a cloth to keep it clean and held the table to stabilize it. A supporting nurse kept the surgical light and the equipment of radioscopy away from the patient,

held the bed, never the patient alone and kept speaking to the patient. When the shakes subsided, we took the opportunity to restart the surgery which ended at 15:11. Other members confirmed the damage situation and switched the automatic system of two entrance doors to manual in order to secure evacuation routes. We also gathered information from the radio.

地震直後より、他部署からの応援要請が続いたため、スタッフの精神的・身体的負担の緩和、安全確保、確実な情報伝達を行うために、2名1組の応援体制をとった。

トリアージブースのベッド作成やトリアージポストから各ブースへの患者移送、病院へ避難してきた市民の避難誘導などを担当した。

夕方には、断水に備え、容器に水を備蓄した。また、救急外来に運び込まれてくる低体温の患者に備え、保温庫で補液を温めた。

20時に帰宅許可があり、師長と相談の上、帰宅するスタッフと、翌日まで手術や応援に対応するスタッフを決めた。

As other departments had continued to ask for our support immediately after the earthquake, we took up a system to support them in pairs in order to relieve the mental and physical burdens of our staff, ensure safety and transmit reliable information.

We took charge of making beds in triage booths, transferring patients from triage posts to each booth, guiding citizens who had evacuated to the hospital among other things.

In the evening, we reserved water in containers in preparation for the water supply suspension. We warmed up the bags of infusion solution in heat insulation boxes in preparation for hypothermic patients being brought into the emergency room.

At 20 o'clock, the staff were permitted to go home, and, in consultation with our chief nurse, we decided on members who were going home and the others who were staying in the hospital until the following day in order to respond to operations and provide backup.

II. 活動報告と今後の課題

1. 応援体制

手術室内でのルールとして、助手を含めた2名1組の行動、応援実働時間の設定と休息時間の確保、スタッフ間の情報共有を決めた。

1) トリアージポスト、トリアージブースへの応援

各ブースでの応援要請があったのは翌日からだった。ポストでの患者の受け入れ、各ブースへの患者移送、診察介助・創処置・記録・帰宅者の対応等の応援にあたった。要請があれば、その都度必要な人数が応援に向かった。

緑ブースでは、リーダーが不在のことがあり、誰に指示を仰げばいいのかわからず、戸

惑うことがあった。現場を統括するリーダーの存在は不可欠であり、各ブースのリーダーと一目でわかるような工夫、例えば、腕章、ネームベストのようなものを検討していく必要があると感じた。

II. Our activity report and future issues

1. Support system

We decided our rules in the Central Room of Operations and Materials, which included acting in pairs with a nursing assistant, setting up support work hours, securing rest time and sharing information with the staff.

1) Support of the triage posts and the triage booths

It was from the following day that we were asked to give support at each booth. We assisted in accepting patients at the triage posts by transferring patients to each booth, doing medical examinations, treating injuries, recording medical records and responding to people who wanted to go home. Whenever there was a request, the required number of staff went over to support.

At the green booth, the leader was sometimes absent, which confused us because we didn't know who to ask for instructions. The presence of a leader to supervise the site is essential, and we think that it is necessary to consider gear such as an armlet, a name-vest by which we can easily tell who the leader is of each booth.

また、トリアージタグの記載方法や活用方法が、スムーズにいかなかった事があり、トリアージに関する知識や経験不足を痛感した。今後は、災害だけでなくあらゆる場面を想定したトリアージ訓練に参加し、知識を得ていくことが重要と考える。

Furthermore, the way of recording and using triage tags could not be carried out smoothly, which made us strongly feel our lack of experience and knowledge on triage. In the future, it is important for us to participate in triage drills that assume not only a disaster but also all stages of emergencies and to acquire knowledge.

2) 遺体安置所(新城小学校)へ[2日目]

遺体安置所となっている新城小学校へ向かい、亡くなった方々の遺体の受け入れと死亡確認の場に立ち合った。

遺体安置所に出向いたスタッフは、後にこう振り返っている。

『広い体育館は寒く、次々運ばれてくる遺体は水に濡れて、冷たく、泥まみれであった。遺体に掛けるものがないため、新聞紙を広げて掛けることしかできなかった。最後にせめてもと思い、手を握り、合掌をした。「運ばれて来る人がもしも家族や身内だったら…。」家族でないことを願う気持ちの一方で、家族だったら少しでも早く見つけてあげたいという複雑な気持ちで、精神的に辛い状況での任務だった。』

2) To a morgue (Shinjo Elementary School) [the second day]

Some of us went to Shinjo Elementary School which was used as a morgue. We

accepted bodies of those who had passed away and confirmed deaths.

Later, some staff members who had presented themselves to the morgue looked back as follows.

“The large gymnasium was cold, and the dead bodies being brought one after another were wet with water, cold and covered with mud. As we had nothing to cover them with, we could only spread out sheets of newspaper and cover the bodies with them. We thought we should do something at the very least, and held their folded hands and prayed. ‘What if someone brought here were my family...’ We hoped that they were not our family, as we felt that if they had been, we would have wanted to find them just that little bit sooner; we would endure complex emotions, and would have to carry out our duty in a mentally painful state.”

3) 病棟への応援

<3 東病棟>〔5 日目〕

電力不足により病棟での自然分娩が困難になると予測され、手術室での分娩介助の協力の依頼があった。そこで、必要物品の準備、介助の手順の説明を受け、さらに壁に手順を掲示し、受け入れ体制を整えたが、電力が復旧し、手術室での分娩はなかった。

3) Support for the wards

<The 3rd Floor East Ward> [Day 5]

It was predicted that a natural birth in the 3rd Floor East Ward would become difficult due to a power shortage, and we received a request for cooperation of delivery assistance in an operating room. We listened to an explanation of what items were required for delivery and how to assist with the procedure, posted the procedure on a wall and adjusted our accepting system. However, the power was restored, and we had no delivery in the operating room.

<4 北病棟・4 西病棟>〔13 日目〕

病棟は、他病院への搬送患者のサマリー作成による、業務多忙のため、各病棟へ 2 名ずつ応援を行った。依頼内容は患者の清拭だったが、実際には注射、死亡退院のお見送り、食事介助、褥創処置など多岐にわたった。患者情報もわからないまま、自分達だけで判断して行動しなくてはならなかった。

今後、より効果的な応援体制を確立するために、担当者間の密な連絡と情報共有が必須である。

<The 4th Floor North and West Ward> [Day 13]

The wards were so busy in preparation of patient summaries for those to be transferred to other hospitals that we sent two nurses to each ward for support. What they requested was the wiping of patients, but the supporting nurses actually covered a whole range of tasks such as injections, sending-off patients that had passed away at

the hospital, feeding inpatients and treating bedsores. Not knowing their circumstances, we had to act according to our own judgment.

In the future, in order to establish a more effective support system, it is essential for staff members to closely contact each other and share information.

4) 避難所での診療活動[6日目]

各避難所や施設、また、在宅の被災者を巡回することで、病院に来たくても来ることができない患者が医療を待っている現実を知った。こちら側から出向く医療も必要であると感じた。

4) Medical care activities at shelters [Day 6]

By making our rounds to each shelter, facility and victims at home, we realized that there were patients who wanted to come to the hospital but couldn't and were waiting for medical care. We felt that it would also be necessary for us medical care teams, to visit them.

5) その他の活動・心に残ったエピソード

<清掃>

患者や避難者など多数の出入りで、病院全体が泥で汚れていた。自分たちで何か出来ることはないかという思いから、業務の合間をぬって、頻回に、玄関・2Fフロアの清掃を行った。

5) Other activities and events that remain in our minds

<Cleaning>

The coming and going of people such as patients and evacuees made the whole hospital dirty with mud. Thinking of what we could do ourselves, we frequently cleaned the entrance and the 2nd floor within the breaks between our services.

<お水>[2日目]

誰もが断水のため水を満足に飲めていないという状況に気づき、やかんを総合受付前に設置し、飲み水として提供し、多くの人を利用した。その後、ある女性から「あの時の水の味が忘れられない。あの水で生き返ったよ。」という話が聞かれた。

トリアージポストなど、最前線で看護をすることも災害医療として大切であるが、人間の基本的欲求を満たすことも忘れてはならない看護のひとつであったと感じた。

<Water> [Day 2]

Noticing the situation that most had hardly been able to drink water due to a water outage, we placed water in kettles in front of the general front desk and provided it as



drinking water, and many people made use of it. After that, a woman said, “I cannot forget the taste of that water. It revived me.”

For disaster medical care, it was important for nurses to do their duties at the forefront such as triage posts; I also felt that satisfying the fundamental needs of human beings was one of the nursing activities that should not be forgotten..

2. 中央手術材料室内の動き

1) 手術室

震災の影響により、予定手術はキャンセルとなった。手術室では、24 時間、緊急手術に対応出来るようにスタッフが待機していた。使用可能な器械セット数と、院内にある輸血の在庫を毎日確認し、ホワイトボードに貼り出し、スタッフに周知した（写真 2）。

災害時は、外傷による緊急手術を想定していたが、実際は違った。手術は2週間で12件行われた（表1）。その中でも印象的だった症例をあげる。

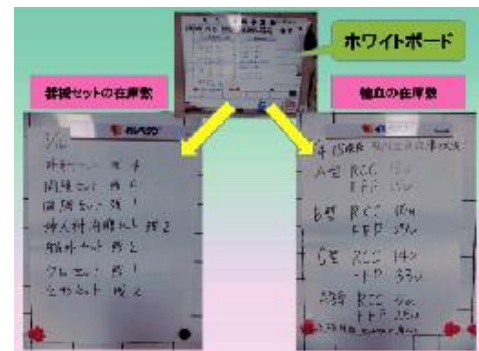


写真 2
Photo 2

2. Activities in the Central Room of Operations and Materials

1) Operating rooms

Due to the impact of the earthquake disaster, scheduled operations were canceled. In the Central Room of Operations and Materials, the staff were on standby for 24 hours in case of an emergency surgery. We made known to all staff, the daily the number of available instrument sets and the quantity of blood bags stocked in the hospital by posting the information on a whiteboard (Photo 2).

In the event of a natural disaster, we had assumed that there would be a lot of emergency surgeries due to trauma, but that wasn't the case. Twelve surgeries were carried out in two weeks (Table 1). The following are some of the most memorable cases among them.

<帝王切開>

産声を聞いたとき、スタッフから自然に拍手が起こり、笑顔と涙があふれた。多くの命が失われた一方で、新しく生まれた命・・・命の尊さを実感し、絶望の中に希望の光を見つけた瞬間だった。

<Cesarean section>

When we heard the baby first cry, the staff naturally started applauding, tears and smiles were all around While many lives had been lost, a newly born life...it was the moment that we realized the preciousness of life and we found a ray of hope in the middle of despair.

<小腸穿孔・外傷>

震災のストレスによる穿孔や瓦礫片付け中の怪我だった。ある患者から、「こんな大変な時に、これぐらいの怪我で皆に迷惑かけて申し訳ない。」と何度も詫びられた。患者にこれ以上の辛さを感じさせないように、声掛けを絶やさず、傍に寄り添った。

<A small bowel perforation, trauma>

Some had perforations caused by the stress of the earthquake disaster or injuries during the cleaning-up of debris. One patient apologized many times saying “I am very sorry for causing the staff trouble with my mild injury at such a time.” To ease the patient’s guilt, we reached out to the patient to and stayed close by.

表 1 3/11～3/24 までの手術の一覧

月 日	病 名	麻 酔	時 間
3/11	右橈骨遠位骨折	伝達	14:21～15:11
3/12	38 週骨盤位帝王切開	腰椎	8:20～8:40
3/14	既往帝王切開	腰椎	13:28～14:01
3/16	左大腿ヘルニア陥頓	腰椎	0:09～1:00
	小腸穿孔	全身	13:33～16:45
3/17	汎発性腹膜炎	全身	12:35～13:52
3/20	顔面裂傷	局所	12:57～13:40
3/21	下顎・口唇裂傷(自殺企図・下顎骨折)	局所	15:07～15:25
3/23	消化管穿孔・腹膜炎	全身	2:18～3:31
3/24	右足部異物刺入	腰椎	12:52～13:37
	両側慢性硬膜下血腫	局所	14:08～14:41
	38 週既往帝王切開	腰椎	14:33～15:11

List 1 The list of operations from March 11 to 24

Date	Names of Diseases	Anesthesia	Time
3/11	Right distal radius fracture	Block	14:21～15:11
3/12	38 week breech Cesarean section	Lumbar	8:20～8:40
3/14	The 2nd Cesarean section of a patient with her history of the 1st	Lumbar	13:28～14:01
3/16	Left femoral incarcerated hernia	Lumbar	0:09～1:00
	Small bowel perforation	General	13:33～16:45
3/17	Panperitonitis	General	12:35～13:52
3/20	Facial laceration	Local	12:57～13:40
3/21	Lower jaw, lip laceration (suicide attempt and lower jaw fracture)	Local	15:07～15:25
3/23	Gastrointestinal perforation, peritonitis	General	2:18～3:31

3/24	Right foot piercing by a foreign body	Lumbar	12:52～13:37
	Bilateral chronic subdural hematoma	Local	14:08～14:41
	The 38 week second Cesarean section of a patient with her history of the first	Lumbar	14:33～15:11

帝王切開術後の患者は、眼科手術台の上に担架を敷いた簡易ストレッチャーを作り、移送した（写真3）。余震が続く中手術が行われた。恐怖や不安を抱えながら、その思いを患者に気付かれないように気を付けた。一方で、スタッフからは、手術室業務を行っているとは日常に戻れ、被災したことを忘れる自分がいたという言葉も聞かれた。

We made a simple wheeled stretcher by laying out a stretcher on an ophthalmic operating table and transferred the postoperative patient of the Cesarean section (Photo 3). Surgeries were performed in aftershocks. We kept feeling anxious and scared but were careful not to make patients aware of our feelings. On the other hand, we heard from the staff that the felt like they had returned to their normal life and forgot about being affected when operating room services commenced.



2) 中央材料室

地震直後、自家発電に切替わり、高圧蒸気滅菌機、ガス滅菌機、プラズマ滅菌機、簡易滅菌機の全ての機器は使用可能であった。しかし高圧蒸気滅菌機とガス滅菌機については、安全性を確認していなかったため使用しなかった。また、電力消費を最小限にするため、簡易滅菌機のみ使用した。16日に、電力供給が再開し、高圧蒸気滅菌機、器械洗浄機、超音波洗浄機が、29日にはガス滅菌機が再稼働した。

2) The Central Materials Room

Immediately after the earthquake, the electric power supply was switched to in-house power generation, and all the equipment including high-pressure steam sterilizers, gas sterilizers, plasma sterilizers and simple sterilizers were available. However, we did not use the high-pressure steam sterilizers and gas sterilizers as we weren't sure if they were safe to use. In order to minimize power consumption, we only used the simple sterilizers. After power supply resumed, high-pressure steam sterilizers, instrument washing machines and ultrasonic cleaning machines were restarted on March 16, and gas sterilizers were restarted on March 29.

中央材料室の機能が復旧するまでの間、スタッフは待機班と応援班に分かれて行動した。待機班は、トリアージブースで使用した器械の回収に回った。通常は機械による洗浄・乾燥を行っているが、使用できないため、徒手洗浄後、十分に乾燥させメンテナンスを行い、簡易滅菌機で滅菌し、払い出した。病棟の器械は、主に分娩セットの使用が多く、同様の方法でスムーズに対応できた（写真4）。

Until the functions of the Central Materials Room were recovered, the staff had been acting in two groups; a waiting team and a supporting team. The waiting team was going around receiving instruments that had been used at the triage booths. Usually, we would wash and dry instruments by machines, but these were not available at the time, so we washed them by hand and followed by adequate drying and maintenance, sterilized them by the simple sterilizers and supplied them. Instruments used in the hospital wards were mainly labor-sets, which we were able to respond to with smoothly in the same way mentioned above (Photo 4).



応援班は、看護師と共にトリアージブースでの対応、避難者の誘導、清掃、物品の運搬などを行った。

ガーゼ類などの衛生材料は在庫確認し、払い出しに対応できるよう準備していたが、処置での使用が少なかったため、それほど目立った動きはなかった。しかし、中央材料室にある衛生材料の在庫には限りがあるため、今後どのような場合にも対処できるように、備蓄用の衛生材料やディスポーザブル製品を常備することも検討していく必要がある。

The support team was doing tasks such as responding at the triage booths, guiding evacuees, cleaning and transferring materials together with other nurses.

In regard to sanitary materials such as different types of gauze, we had checked the stock in the Central Materials Room and prepared it so that we could respond accordingly, but there were only a few times they were used in treatments. However, as the stock of sanitary materials in the Central Materials Room has its limits, we needed to consider keeping sanitary materials and disposable products for storage always on hand so that we would be able to respond to any cases in the future.

3) 災害の記録と勤務の管理

ホワイトボードを用いて、応援配属も含めた人員配置、応援内容や実働時間の把握を行

った。このボードの活用は、その時点でのスタッフの動きを把握することや、迅速で適正な人員配置を行うには有効であった。しかし、同時に記載していた災害用連絡ノートの内容に不備があったため、今後は災害の記録を残す方法を検討していく必要がある。

3) Disaster memorization and management

Using a whiteboard, we grasped the staffing situation including support assignments, the contents of support and working hours. The use of this board was effective in grasping the movement of staff at that time and in performing prompt and appropriate staffing. However, as there were some flaws in the contents of our communication notebook of the disaster, which we wrote at the same time, we feel it is necessary to consider how to keep record of disasters in the future.

震災から数日は院内に宿泊していたスタッフが、夜間の応援や臨時手術に対応していたため、24 時間を通して勤務することもあり、精神的・肉体的負担が大きかった。そこで、震災後 5 日目より、変則二交替制勤務（三人夜勤）をとった。当時は、PHS や携帯電話などの連絡手段がなかったため、夜勤者は院内に待機し、臨時手術に備えた。この勤務体制を試みたことで、スタッフの精神的・肉体的負担が軽減し、非常時には夜勤を視野にいれた柔軟な勤務体制を取り決めていくことが必要と考える。

As the staff members who were staying at the hospital were responding to support at night and urgent surgeries for several days since the earthquake occurrence, they were sometimes working for 24 hours, which had took a toll on them physically and mentally. From the 5th day after the earthquake, we took up an irregular two-shift system (night shifts by three members). As we had no means of communication such as PHS's and mobile phones at the time, night shift workers were on standby in the hospital and preparing for urgent surgeries. By trailing this work system, we were able to reduce the mental and physical burdens of our staff; in light of an emergency, it will be necessary to arrange a flexible work system that takes night shifts into consideration.

III. まとめ

〔中央手術材料室の課題〕

- ①医療材料等の備蓄、及び、キット化・ディスプレイ製品導入の検討
- ②担架等の避難用具の早急な整備
- ③ME 機器の転倒・滑り防止対策の徹底
- ④夜勤も視野にいれた、柔軟な勤務体制を取り決め、マニュアル化する
- ⑤定期的な災害訓練の実施、災害教育による災害の意識化を図る
- ⑥災害時の記録方法の検討

III. Summary

[The challenges of the Central Room of Operations and Materials]

- (1) The consideration of reserving medical materials and introducing product kits and disposable products
- (2) The rapid preparation of evacuation tools such as stretchers
- (3) Thorough measures to prevent toppling and sliding of ME equipment
- (4) Arranging and standardizing a flexible work system with night shifts taken into consideration
- (5) Planning regular disaster training and raising awareness of disasters by disaster education
- (6) Consideration of a recording method during a disaster

【病院全体の課題】

- ①連絡網の徹底、情報伝達・手段の整備
- ②円滑なエリアマネージメントを行える人材の育成、リーダーシップ教育の強化
- ③応援体制のマニュアル化、及び継続した教育・訓練の実施
- ④病院全体で長期間にわたる災害を想定したマニュアルの作成と訓練の必要性

私達は災害医療の現場において、一人一人が組織の一員として役割を果たすことができた。

[The challenges of our entire hospital]

- (1) The construction of a thorough communication network and the maintenance of information transmission means
- (2) The development of human resources capable of performing smooth area management and the strengthening of leadership education
- (3) The standardization of the support system and the constant implementation of education and training
- (4) The necessity of making a manual of the entire hospital aimed at responding to a long-term disaster and its training in accordance to the manual

Each of us has been able to play a part as a member of the organization in the field of disaster medical care.

おわりに

今回の震災は、私達から多くの大切な人や物を奪い去っていった。しかし、その困難な状況の中でも、私達は強くなり、学びながら前へ進もうとしている。

自分自身も被災者である状況で、家族をはじめ、大切な人々の命を案じながらも、必死に活動していた。私達は、医療従事者という立場から、助けたい、役に立ちたいという使命感にかられ、自分を追い込みすぎることもあるが、限界を知る勇気を持つことも、時には必要なかもしれない。

In Conclusion

This earthquake disaster took many precious people and things from us. However,

even in a difficult situation like that, we have become stronger and are going to make progress while learning.

In a situation under which we ourselves were also victims, we were working desperately while worrying about the lives of loved ones including our family. Although as healthcare workers we are driven by a sense of mission of wanting to help people and being useful, sometimes we push ourselves too much. It might be necessary to have the courage to understand our own limits at times.

東日本大震災において気仙沼市立病院 中央放射線部が果たした役割と今後の課題

The Engineering Department
The Radiation Room

The role that the Central Radiation Department of Kesennuma City Hospital had played in the Great East Japan Earthquake and our challenges for the future

I. 3 月 11 日 14:46 地震発生直後について

5 番（骨系撮影室）、6 番（胸腹部撮影室）、RI 室、心カテ室においては検査中の患者はいなかった。CT 室では患者を撮影台よりベッドに移動中に地震が来た。CT の電源は落ちたが、CT 本体は正常で、非常電源で運用可能だった。MRI 室では病棟の患者の頭部を検査中で、操作室の電源が落ちて暗い中、患者を MRI のドームより救出しようと寝台移動ボタンを押したが反応せず、寝台を手で引き出すことで救出に成功した。撮影寝台は通電中には移動制御のため動かないが、停電だと片手で簡単に引き出すことが可能な設計であった（Philips 製）。引き出された患者はこの地震に全く気づかない様子で、随分揺れる検査だと思っていたようだった。

I. Our situation immediately after the earthquake at 14:46 on March 11

There were no patients under examination in Room No. 5 (the imaging room of the bone system), Room No. 6 (the imaging room of the chest and the abdomen), the RI Room and the Heart Catheter Room. It was when we were moving a patient from an imaging table on a bed in the CT Room that the earthquake occurred. The power was cut off, but the main part of the CT was fine and available with emergency power supply. In the MRI Room, a patient of a hospital ward was undergoing a head examination. In the dark with the power of the operation room having failed, a staff member pressed the button to maneuver the bed to rescue the patient from the MRI dome, but it did not work. However, we successfully rescued the patient by drawing the bed out by hand. The bed for imaging had been designed to not move to control its

movement while being ON, but we found it easy to draw out with one hand during a power failure (Philips Ltd.). The patient we pulled out did not seem to notice the earthquake at all, he thought that the shaking was part of the examination.

MRI 本体はドームのカバーが外れ、外見はかなり損傷している様に見えた。この機器はドーム内磁場を保つため液体ヘリウムで 24 時間冷却し続けているが、パイプが外れ急激に抜けるとクエンチングと言う大爆発が起こる危険性がある。幸い、予定通りに非常電源が起動して冷却も継続されたが、サービスマンによる点検が済むまで使用不能と判断した。サービスマンとの連絡は、一部の携帯電話 (au) しか使えないために 17 日まで連絡できず、また、ガソリンの入手が困難で、多くは仙台に事業所や営業所を設置している各社担当者が気仙沼まで来訪することができずに、点検修理もままならない状況だった。真っ先に来院したのは国産メーカーであり、ある会社は当院との連絡がつかない中、ガソリンをかき集め必死で来たという。外資系会社はインフラが整ってからの来院で、やや対応が遅いと感じた。

The dome cover of the main part of the CT had come off, and it appeared to be severely damaged. Usually, this apparatus is kept cool 24 hours a day with liquid helium to retain the magnetic field in the dome, but there was a risk of a big explosion, called quenching, that could occur if the pipes came off and the helium gas suddenly passes through. Fortunately, an emergency power supply started on schedule, and the cooling continued, but we made a judgement that the apparatus would be unusable until a serviceperson completed the inspection. We could not contact a serviceperson up until March 17 because we could only use certain mobile phone providers (au: a mobile phone company). Also, gasoline was hard to obtain, and most of offices and sales offices were located in Sendai, all of which prevented each company person in charge of our hospital from coming all the way out to Kesennuma; so we were in a situation which we could not check and repair the apparatus' as we wanted. It was a serviceperson of a domestic manufacturer who was the first to arrive at our hospital; he had stocked up on gasoline and headed to our hospital desperately even in such a situation where he had not been able to contact us at all. Other servicemen of foreign-affiliate companies came to the hospital after local infrastructure had recovered, and we felt their response somewhat late.

院内が地震直後より非常電源となり放射線部で使用可能な機器は 5 番 (一般エックス線撮影)、CT、心臓カテーテル検査室、ポータブル (移動回診車) のみで、エレベーターが止まっているのでポータブルも同一フロアしか移動できず、各階からの患者は担架で来ることになった。故障のため使えない機器は MRI だけであったが、仮に故障していないとしても稼働のための必要電力には足りない状況で、非常電源は MRI 冷却用の液体ヘリウムを供給するので精一杯であった。CT においては、非常電源では頭部の CT を撮影するのがやっ

とであり、腹部 CT は X 線管電流を通常の 2 分の 1 から 3 分の 1 に落とさなければならなかった。なぜならば、部屋の明かりが暗くなり、機器が止まりそうになるためである。

As the power supply of the inside of the hospital immediately switched over to the emergency power supply after the earthquake, the apparatuses available in the radiology department were Room No. 5 (general X-ray photography), CT, Cardiac Catheterization Examination Room and portables (movable round carts for radiography). Due to the elevators being unavailable, the portables were only able to move around on the same floor, and patients from each floor had to come to our floor by stretcher. The only apparatus that couldn't be used due to complications, was the MRI, but we were in a situation under which we did not have enough power required to operate it even if it worked, and all the emergency power supply could do was cool the MRI's liquid helium. In regards to the CT, the emergency power supply barely allowed for capturing pictures of the head, and we had to reduce the electric current of an X-ray tube down to a half to a third of the normal current in order to take abdominal CTs. This was because the light of the room became dim, and the equipment was about to stop.

地震災害時の各種機器への対応について、医療機器メーカーの東芝メディカルに問い合わせたところ、特殊な対策はとっていないが、コンクリートに JIS の設置基準にてアンカーボルトで止め、建物が無事であれば装置は殆ど復旧可能とのことであった。また、終業時の機器のポジション（写真参照）も決まっており、当院ではそれを確実に実行していたことが機器の破損を防ぐことができた一因だと考えている。

When we asked Toshiba Medical Co. Ltd., one of the medical equipment manufacturers, how to respond to various equipment at the time of an earthquake disaster, they did not have any special measures but told the apparatuses would be recoverable if they had been bolted with anchor bolts on a concrete floor according to the installation standards of JIS (Japanese Industrial Standards) and if the building had also been safe. In addition, we had also determined the position of the apparatus at closing (see photo) and we believe that the fact that we were able to



X 線透視装置の電源オフの状態

寝台が横倒しで一番下に降りていて、地震による転倒を防ぐ

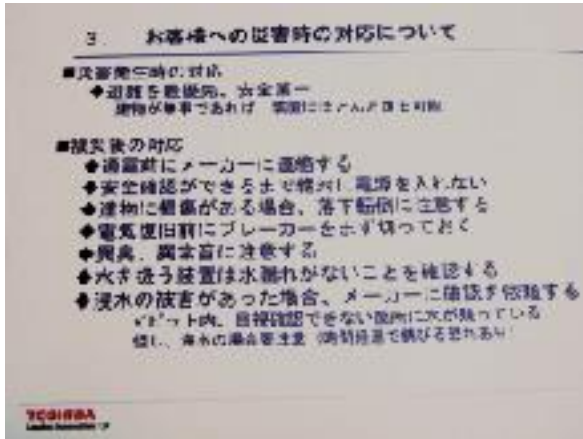
The power-off state of a fluoroscopic photographing apparatus

The bed had been pulled down to the very bottom in its sideways state, which prevented the bed from falling down by the earthquake.

reliably do so was one of the reasons why we were able to prevent damage of equipment.

II. 地震発生から一時間の状況

地震発生から一時間は放射線部への検査依頼は全くない時間帯であった。各技師は非常電源で使える各機器を点検し、大量に搬送されてくると予想された救急患者の対応に備えなければならなかった。予想外に物品の落下は少なく、2 番（泌尿系撮影室）で軽量の医療物品の落下を認める程度であった。各機器の点検は、毎年 5 月に訓練している非常電源テストで慣れていたおかげで、冷静に対応することができた。MRI 以外すべての機器は正常であった。



テレビでは 6m の大津波が来ると報道していた。当市に於いても甚大な被害が予想された。

II. The situation an hour after the earthquake occurrence

The hour from the occurrence of the earthquake was a period of time in which there were no reserved examinations at the Radiation Department. Each technician had to inspect each apparatus that was available on emergency power supply and to prepare for an emergency response to patients supposedly needing to be transferred in large numbers. The number of things that fell were surprisingly few, only with the fall of lightweight medical items in Room No. 2 (the imaging room of the urinary system). We were able to calmly inspect each apparatus because we had trained and practiced testing the emergency power supply every May. All pieces of equipment except the MRI were functional.

The TV was broadcasting that great tsunamis predicted to be 6m tall would come. We expected serious damage in our city.

III. 地震後 1 時間後から 1 日目の様子

非常電源による電力提供中は、多くの電力を消費する撮影機器の使用が著しく制限されるため、放射線技師本来の仕事量は極端に少なくなった。

地震 1 時間後、津波により病院脇の道路まで冠水し、救急室まで車両が登って来られないため、急遽ボイラー室 B1 を仮設トリアージポストに定め、ここから 2 階西病棟の廊下までの患者搬送要請があった。当日勤務の男性技師 6 人でエレベーターの代わりに階段で 3 階相当を担架で運んだ。私で 6 回程運んだのだが、階段上側に 2 人、下側に 4 人の 6 人で搬送するのがベストであった。軽い女性の患者だからと 4 人で搬送した時は腕が抜けそう

で辛かった。ボイラー室前からの搬送はPM6 時頃までで終了し、次いで救急室から 3 階北、4 階西、5 階病棟等への患者搬送に従事した。

III. The state of the day from 1 hour after the earthquake

Due to imaging equipment consuming a lot of electricity under restricted emergency power supply, the main workload of our radiologists became extremely small.

Around 1 hour after the earthquake, roads around the foot of the hospital were flooded by the tsunami, and cars could not climb up to the entrance of the emergency room; therefore, the hospital hurriedly appointed Boiler Room B1 as a temporal triage post, from which we were requested to transfer patients upstairs to the corridor of the 2nd Floor West. The six male technicians on duty that day transferred patients on a stretcher via a staircase with its height equivalent to three-floors instead of using an elevator. I did this 6 times or so. The best way to transfer a patient on a stretcher with 6 people, was with 2 people on the upper stairs and 4 people on the lower stairs. When 4 of us tried to transfer a lightweight woman, I felt so much pain, as if my arms had been coming out of their sockets. The transportation from the front of the boiler room was completed by about 6:00 PM, from there we engaged ourselves in patient transfer from the emergency room to the 3rd Floor North Ward, the 4th Floor West Ward and the 5th Floor Ward.

また、伝染病棟に遺体を 2 回搬送した。

本来、救急室まで車両が通れて、エレベーターが自家発電で正常に機能していればこのような移動の必要はない。新病院建設の時にはこういう事態を想定することが必要であろう。大震災でなくとも停電は起こり得ることなので、日頃よりリハビリ室、検査室、医事課職員と連携して患者搬送チームを設置し、実際に人間を担架に乗せて階段を上り降りする訓練をしておくべきだと感じた。

We also transferred dead bodies to the Infectious Disease Ward twice.

Originally, if a car had been able to arrive directly at the front of the emergency room and an elevator had been functioning properly by the in-house power generation, there would have been no need for a transfer like that. It might be necessary to assume a situation like that when we plan the construction of our new hospital. Since such a power outage will happen even without an earthquake, I think that we should set up patient transfer teams in cooperation with the staff members of the Rehabilitation Room, the Medical Laboratory and the Medical Matters Department on a daily basis and that we should keep training ourselves in going up and down the stairs while actually carrying a person on a stretcher.

IV. 地震 2 日目以降について

震災 2 日目～3 週目までは東京、埼玉、東北大学等からの医療支援チームが来院し、患者

が増える時期だった。ドクターが増えると放射線検査件数が増えるのは確実で、我々の業務は本来のあるべき姿に戻った。24 時間体制を 11 人の技師で対応するため、次の項目を基本に勤務シフトを作成した。

- 勤務時間帯にこだわらない。本人の事情を優先する。
- 泊まり勤務の後は 1 日以上、間をあける。
- 昼間は 7 名位、夜間（20 時以降）は 3 名位。技師長は病院に寝泊まりする。（夜間勤務する者は、明けて日勤時間帯も働くので 24 時間勤務となる。）

14日 月	15日 火	16日 水	17日 木	18日 金	19日 土	20日 日	21日 月	22日 火	23日 水	24日 木	25日 金	26日 土	27日 日	28日 月	29日 火	30日 水	31日 木
W	N	W	N	W	N	W	N	W	N	W	N	W	N	W	N	W	N
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

14日 月	15日 火	16日 水	17日 木	18日 金	19日 土	20日 日	21日 月	22日 火	23日 水	24日 木	25日 金	26日 土	27日 日	28日 月	29日 火	30日 水	31日 木
W	N	W	N	W	N	W	N	W	N	W	N	W	N	W	N	W	N
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

IV. The situation from the 2nd day after the earthquake

From the 2nd day to the 3rd week after the earthquake, medical support teams from Tokyo, Saitama, Tohoku University and others, and an increasing number of patients visited the hospital. As the number of doctors increased, the number of radiographic examinations increased; our work went back to the way it should be. In order to respond to around-the-clock operations among 11 radiographers, we created a work shift based on the following:.

- (1) Duty hours will be flexible. Circumstances of each staff member are the main priority.
- (2) An interval of one day or more after night duty will be given.
- (3) About 7 members will work in the daytime, and about 3 members at night (from 20:00). The chief will stay in the hospital; those working nightshifts will also work in the daytime on the following day, so their shift will be counted as a 24-hour duty.

3 月 15 日には電源が復旧し、MRI、RI を除くすべての検査が可能となったが、診療が救急外来体制だったので、通常であれば救急シフトは 1 日 1 人の技師で済むはずであったが、患者数がかつて経験したことがない位多く、上記の勤務シフトで業務を遂行した。

Electrical power was restored by March 15, and all examinations except MRI scans and RI scans became available. However, the medical treatment was an emergency outpatient system, the emergency shift would normally be done by one technician per day, but the number of patients was unprecedented, so work was carried out following

the above work shift.

CT 検査で 121%～185%、X 線検査で 158%～196%の検査数増加となり、従って、24 時間勤務後、1 日休みのシフトを 2 人体制で 4 月 4 日まで続けた。撮影そのものは単純で難しいものは少ないのだが、24 時間切れ間無くオーダーされるのが辛かった。

There was a 121% to 185% increase and 158% to 196% increase of the number of CT examinations and the X-ray examinations, respectively. Therefore, we had kept with work pairs taking a day off after 24-hour work shifts until April 4. Although photographing itself was simple and easy, it was hard for us to be ordered round the clock without a break.

また、この時期は日本各地から救援物資が当院に届けられた時期でもあった。物資の保管場所として、正面玄関に近く他部署ともアクセスしやすい透視室 7 番と泌尿器系撮影室 2 番を利用することになった。7 番は主に米などの食料品を、2 番は紙おむつなどの生活医療品を保管した。3 月末には、寄せられた支援物資が部屋全体（24 畳程の広さ）の天井に達するほどであった。部屋は常に施錠し、総務部と一部の職員にしか物資の存在を周知させなかった。震災発生後 1 週間目までは病院内でさえ治安が不安定で、この秘密倉庫はとても有意義な使用法であった。24 時間寝泊まりしている当部技師がカギを管理していたので、安心して保管することができ、セキュリティといった面でも貢献できたのではないかと考えている。

Moreover, it was also around this time when relief supplies were being delivered to our hospital from all over Japan. We decided that we should use the X-ray Imaging Room No. 7 and the Urological Imaging Room No. 2 as the stores of those supplies, which are close to the front door and also easy to access from other departments. We stored mainly food products such as rice in No. 7, and daily necessities and medical products such as disposable diapers in No. 2. At the end of March, the amount of relief supplies that had been delivered was almost reaching the ceilings of the entire rooms (with each floor space of about 24 tatami mats [about 40 m²]). Those rooms were always kept locked and only the General Affairs Department and select staff members were informed of the existence of the supplies. As public safety had been unstable even in the hospital for the week following the earthquake: the secret warehouse's use was of significance. The technicians, who were staying on site on a 24-hour basis, were managing the keys of the warehouses. We were reassured that the keys were well looked after; which contributed to the security of the place as well.

V. まとめ

激動の 3 週間を振り返ってみた。レントゲンは電気がなければ仕事にならない。災害でも我々が全力で仕事できる様に自家発電が大容量で安心して使えることを要望したい。4

日間の自家発電による業務であったが、この間は放射線技師としての仕事は少なく、その後、長期化すると予想された変則勤務体制を考える時期でもあった。ポイントは休日をいかに取り、体を休ませるかだと思う。この暫定勤務表に従い、各人が病気もせず 24 時間勤務をこなし、混乱もなく行動できた。これは当科のチームプレーがうまく機能したためと思われる。同時に、このチームプレーは震災直後より 1 週間病院に寝泊まりした技師長の人柄や責任感の強さに個々の技師が応えた結果で、各人の責任ある行動の賜物である。日頃より争いのない職場環境を維持することが大切であると感じた。

V. Summary

These were three weeks of upheaval. The Department of Radiation cannot operate without electricity. We would like to secure large electrical capacity of our in-house power generation so that we can accomplish our work even during a disaster. We had 4-days' worth of work that could be with the in-house power generation, but it had little to do with radiology. After that, we had to take on irregular work shifts, which was expected to extend. I think that what matters is how we take days off and how we let our body rest. Following the temporary roster, each of us responded to 24-hour work without getting sick and were able to act without any mix-ups. I suppose that this was because of the teamwork of our department. The good teamwork is attributed to the fact that each technician was encouraged by our chief's good character and his strong sense of responsibility, as he was staying and sleeping in the hospital the week immediately after the earthquake. Also, the team was also the gifted with responsible behavior of every person. I feel that it is important to maintain a work environment free of conflicts on a daily basis.

担送患者をいかにして安全に搬送するか、という課題にも直面した。手が空いている人を有効に利用しシステムチックに患者搬送をすべきであろう。指揮命令系統を再度シミュレーションし、演習によりいつ来るかわからない災害に備えるべきであろう。

We also faced the challenge of how we should carry stretcher patients safely. It should be done effectively by getting help of members that have free time for the systematical transfer of patients. The simulation of the chain of command should reenacted over and over, and we should train to prepare for an unexpected disaster.

技術部
検査室

東日本大震災における検査室の記録

The Technical Department
The Clinical Laboratory

The record of the Clinical Laboratory in the Great East Japan Earthquake

【はじめに】

東日本大震災において、気仙沼市立病院臨床検査室の活動内容を時系列で記録し、課題を整理した。

[Introduction]

During the Great East Japan Earthquake, we recorded the activities of the Clinical Laboratory of Kesennuma City Hospital in sequential order and organized the issues that need to be solved.

【全体として】

地震による検査機器の大きな破損はなかったが、試薬業者や機器メーカー担当者と不通になり、機器のメンテナンスや試薬手配の対応に追われることになった。意外なことに、当院の検査件数は震災後に激減することになった。このことは、多数の重傷外傷患者が病院に搬送され、著しい数の検査オーダーを覚悟していた私たちの予想を大きく覆した。例えば、血液検査は平時の約300件／日から、平均60件／日程度（3月22日まで）に減少した（表1）。すなわち、今回の震災は、移動手段を奪われた有病者が病院にたどり着くのに難しい局面を強いられたことと、大災害でありながら病院受診を必要とする患者数そのものが少なかったという特徴を併せもった災害だったことを、災害拠点病院の総検査数という視点から推察された。

当室職員は、患者および安否確認に来院した市民の方の誘導案内や、救援物資の搬送応援、総合受付や処方箋受付業務にも人員を配置した。待機者については、緊急配置体制をとることにした。

[The overview of the disaster]

Although the earthquake itself left no significant damage to our testing equipment, we found ourselves pressed with responding to the maintenance of equipment and the arrangement for reagents because we were unable to get in contact with any reagent

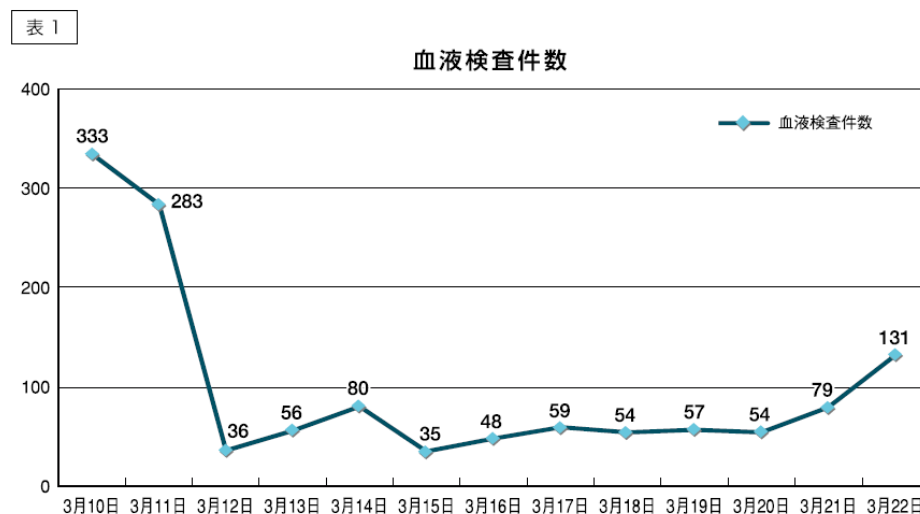
manufacturers and equipment makers. Surprisingly, the number of medical examinations of our hospital had drastically reduced after the earthquake. This fact largely contradicted our expectations that many patients with severe trauma would be transferred to the hospital, and making preparation to receive a significant number of examination orders. For example, the number of blood tests decreased from about 300 cases per day in peace time to about 60 cases per day on average (until March 22) (Table 1). We inferred, from the viewpoint of the total number of medical tests in the disaster base hospital, that the disaster was characterized by the fact that the sick people who had been deprived of their means of transportation faced difficulties to reach the hospital, and that the number of patients who needed the hospital despite the catastrophe, was small.

当室職員は、患者および安否確認に来院した市民の方の誘導案内や、救援物資の搬送応援、総合受付や処方箋受付業務にも人員を配置した。待機者については、緊急配置体制をとることにした。

We placed our staff to guide patients and citizens who came to the hospital for safety confirmation, for the transfer support of relief supplies, for service at the front desk and also for accepting prescriptions at the desk of the pharmacy department. Our staff members on standby were to take the emergency arrangements.

表 1: 血液検査件数

The number of blood tests



【生理検査室】

発災後、検査室にいた患者の安全確保に努め、これを避難誘導した。また、老築化した病棟患者の車椅子や担送避難の補助を行った。

通電が得られるまでは、心電図検査はポータブル機器を用いての対応とした。心臓超音波検査はキャンセルに、脳波・聴力検査の依頼はなかった。

[The Laboratory of Physiological Examination]

After the disaster occurred, we tried to ensure the safety of patients who were in the examination rooms, and guide them to evacuate. In addition, we assisted in transferring patients in the old hospital wards by stretcher or wheelchair.

We decided to use a portable ECG device for electrocardiography until the power supply could be used. Cardiac ultrasound examinations were canceled, and we had no requests of EEG and hearing test.

【生化学検査室】

モニターや端末が一部転倒。地震後直ちに自家発電機に切り替えられ、各種機器や冷蔵庫および冷凍庫を自家発電の電源に接続し直した。通常2台で運用していた血液・生化学分析機を節電のために1台運用とし、検査項目に関しては試薬入庫の目処が得られなかったため、従来の「救急セット」のみの対応とした。

感染症やBNPなどの分析機は自家発電に対応してなかったもので、使用できなかった。外注検査に関しては、検体集配できずに一時的に検査室で凍結保存しておくことになった。同様に、先天性代謝異常疾患に対する検査用ろ紙も宮城県公衆衛生協会に郵送できなくなり、検査室で冷蔵保存することにした。

[The Laboratory of Biochemical Examination]

Some of our monitors and terminals fell down. Electrical power was switched to in-house power generation immediately after the earthquake, and we reconnected the plugs of various types of equipment, refrigerators and freezers to in-house power generation. We normally used two blood-biochemical analyzers, but decided to use only one to save power. To test items, we decided to respond only to traditional medical tests of First-Aid Kits as we could not assess when we were going to get test reagent storage.

Analyzers of infection, BNP and among other things could not be used as they were not compatible with the in-house power generation. For outsourcing tests, we decided made those samples temporarily cryopreserved in our laboratory because they could not be collected and delivered. Similarly, we could no longer send the sheets of filter paper for diagnosing the diseases of congenital metabolic abnormality to the Public Health Association of Miyagi Prefecture; therefore, we decided to preserve them by refrigerating them in our laboratory.

【輸血】

停電のため、院内血液センターの冷蔵庫・冷凍庫ともに警報音が鳴り響き、自家発電用ドラムに電源の接続を切り替えた。通常「払い出し」「在庫」の2系統の保冷システムを有しているが、当面「在庫」用のみの運用とした。停電による在庫輸血の破棄はなかった。発災前に注文していた血液製剤は地震直後に到着したが、その後は宮城県赤十字血液セン

ターと連絡がとれなくなり、輸血製剤の枯渇を免れる目的に期限切れになった製剤も保有しておいた。止むなくこれらの使用を迫られたときには、輸血療法委員会において使用の是非について協議することも考慮したが、幸い使用するに至らなかった。3/11～3/31の期限切れになってしまった血液製剤については、宮城県赤十字血液センターに返品できた。

[Blood Transfusion]

The alarm sound of both the refrigerator and the freezer of the Blood Center in the hospital went off due to power outage, and we switched the connection to the electric drum of in-house power generation. Normally, we have the cold storage system of two lines, ‘Payout’ and ‘Stock’, but decided to make use of only ‘Stock’ for the time being. We discarded no blood bags stocked in the laboratory due to power failure. Blood products that had been ordered before the earthquake arrived immediately after the earthquake, but we could not get in touch with the Red Cross Blood Center of Miyagi Prefecture after that; we kept expired preparations so that we would be able to avoid the depletion of blood preparations. Although we also took into account discussing the pros and cons of their use in the Committee of Blood Transfusion Therapy in the event that we were urged to use them, fortunately, we did not have to. For blood preparations that had expired between March 11 and 31, we were able to return them to the Red Cross Blood Center of Miyagi Prefecture.

【細菌検査室】

市ガスの停止により、約一ヶ月にわたりバーナーの使用ができなくなり、細菌培養にはディスポーザブルの白金耳を使用した。塗抹標本の固定にはカセットコンロを使用した。培地に関しては在庫で対応することができた。

[The Laboratory of Bacteriological Examination]

Due to the outage of gas in the city, we could not make use of burners over the period of one month or so, so we used disposable platinum loops for bacterial culture. We used a portable gas cooker to fix smear samples. In regards to culture mediums, we were able to meet their needs with our stock.

【病理・細胞診断室】

標本の作製や診断結果提出ならびに迅速診断業務が停止した。郵送事情により東北大学病院への病理標本発送も停止することになった。ただし、3月7日から11日までに提出された検体については、3月25日にバスで病院支援にきてくださった東北大学病院の医師に依頼して、大学の診断学教室に届けていただくことができた。以後、4月12日に宅配便による発送が可能になるまで数回届けていただいた。

3月25日以降はFAXによる病理診断レポート送付が可能になったが、大学の病理医は公共交通機関の復旧が得られなかったため、5月末まで気仙沼に来訪できなかった。

[The Room of Pathological and Cytologic Diagnosis]

The preparation of specimens, the submission of diagnostic results and rapid diagnostic work stopped. A decision was made to stop sending out pathological

specimens to Tohoku University Hospital due to postal reasons. However, for samples that had been submitted from March 7 through 11, we asked a favor of some doctors of Tohoku University Hospital who had come to our hospital by bus on March 25 to support us, so they took the samples to the department of diagnostics of the university. After that, they delivered those samples several times until April 12, when express home delivery services became available.

The sending of pathological diagnosis reports by fax became available after March 25, but the pathologist of the university had not been able to visit Kesennuma until the end of May because public transport had not been restored.

【関係業者】

試薬メーカー業者は、ほぼ毎日当院に通って在庫確認をして下さった。通常業務に復するにはおよそ2週間の時間を要し、また、復旧後もしばらくの間は試薬の到着に遅れがでた。検査機器メーカーより、故障機器確認のための職員訪問があり、通信可能となってからは状況確認の電話連絡も入った。

[Traders concerned]

Some dealers of reagent manufacturers were coming to our hospital almost every day to check our stock. It took about 2 weeks to restore normal services, and the arrival of reagents was being delayed for a while even after recovery. The staff members of testing equipment manufacturers came to assess the failure of our equipment. After communication became available, we were receiving phone calls to confirm our situation.

【改善及び今後の対策】

- 感染症及びBNP等分析機を自家発電対応にした。
- 自家発電接続切り替えをスムーズにするため、冷蔵庫・冷凍庫・PC・検査機器などの電源コードにネームを明示した。
- 各機器・冷蔵庫・冷凍庫等と自家発電源との接続状態の再確認と、停電時における検査機器等の接続優先順位の確認、ならびに災害時に対応するための十分な数の接続ドラムの手配をした。
- 各機器の落下、転倒防止のために固定を強化し、棚ガラスの破砕防止処置を行った。
- 停電時に使用する照明類を用意した（今回は、スタンド、懐中電灯などで急遽対応した）。
- 包埋センター・伸展器の自家発電接続を検討中（停電時に、染色・封入の手作業での標本作製を可能にするため）。
- 安全キャビネットの自家発電接続を申請中（最低でも結核菌検査を可能にするため）。
- ディスプレイを充分量常備するとともに、固定方法の見直し（火災固定→メタノール固定）を検討中。

[Our improvement and supportive measures in the future]

Analyzers of infection, BNP and others were made compatible with the in-house power generation.

In order to facilitate the switching of private power generation connections, we clearly labeled power cords of refrigerators, freezers, PCs, inspection equipment, etc.
We reconfirmed the connection status between the in-house power generation and each piece of equipment, refrigerator, freezer and the likes, checked the connection priority of testing equipment in the event of power failure and also arranged a sufficient number of electric drums to respond to a disaster situation.
To prevent any device from falling or tipping over, we strengthened the fixings and took measures to prevent the shelf glass from crushing.
We prepared lighting to be used in the event of a power outage (this time, we promptly responded with reading lights, flashlights).
We are currently considering private power generation of embedding center and extender (to enable manual preparation of dying and encapsulation in the event of a power failure).
Applying for private power generation connection of the safety cabinet (in order to make at least tuberculosis tests possible).
In addition to always keeping a sufficient amount of disposable platinum loops available, we are considering the revision of our fixing method (from flame fixation to methanol fixation).

【おわりに】

2011. 3. 11 14:46 忘れられない日時となった。災害当日からおよそ10日間の記録をまとめたが、とにかく自分が今やれることをやるしかないと思って過ごした日々であった。検査技師19名のうち、津波によって家屋流出した者5名、全壊3名、半壊1名、また、車の水没は9名であった。どの部署でも同様だったと思うが、家族の安否を気遣いながら業務している者もいた。発災が勤務時間中だったので、検査室にいた者の無事は確認できたが、勤務時間外だった者の安否が確認できたのは、数日後になってからであった。本当にほっとしたものである。

検査室として震災で体験したこと、今後の対策等をまとめてみたが、これを踏まえて一歩ずつでも前に進んで行けるように協力しあい、努力していく部署でありたいと思う。

[Conclusion]

14:46 on March 11 has become an unforgettable time and date. I summarized the record of about 10 days following the disaster, when we spent the days thinking that there was no choice but to do what we could. Of our 19 laboratory technicians, five members' houses were washed away by the tsunami, three's houses were completely destroyed and one's house was partially destroyed. In addition, nine people's cars were submerged in water. I think that the situation was similar in every department, but some staff members were working worrying about the safety of their family. As the disaster occurred during working hours, we could assuredly confirm the safety of our members who were in the laboratory. However, it was several days later when we were able to confirm the safety of the others who had been off duty. We felt that all

the tensions were lifted.

I've made a summary from the standpoint of the Clinical Laboratory on the earthquake disaster, future measures and so on. I hope based on this, our department will be one in which we collaborate with one another and makes efforts to go forward even if it's one step at a time.

	生化学検査	生理検査	細菌検査	病理診断	輸血
3月11日 14:46 地震発生 自家発電①②に 待機緊急体制に	感染症、BNP不可 血液・生化学分析機 1台のみ	心電図 ポータブルのみ 使用 心エコー 予約キャンセル 監視・聴力検査 オーダーなし	ガス停止 バーナー使用不可	病理・細胞診標本 作製、診断結果提 出、迅速診断、真 北大への診断問い 合わせ、病理標本 発送不可	冷蔵庫・冷凍庫 一台のみ 3/11注文分入庫
3月12日					
3月13日			3/11までの結果 送付提出		
3月14日			迅速検査のみ対応 ・インフルエンザ ・便中ロタ ・アデノウィルス ・RSウイルス ・CD抗原 ・尿中レジオネラ ・尿中肺炎球菌 ・A群溶連菌		宮城県赤十字セン ター職員到着、在 庫確保
3月15日 未明 自家発電①停止 昼 商用電源復旧	サーバーダウン 報告書を手書きで 提出 サーバー復旧後 正式報告書再提出 PM:感染症、BNP 検査開始 全項目検査開始		電気減速 (ループシネレータ) で白金箔を減速		
3月16日			3/11までの結果 残り提出	通常業務に復旧	
3月17日			インフルエンザキッ ト大数支援		
3月18日 待機通常体制に			東北大学病院から迅 速診断キット支援 ・インフルエンザ ・アデノウィルス ・RSウイルス ・尿中肺炎球菌 ・A群溶連菌		センター職員来訪 在庫補充
3月19日					
3月20日					センター職員来訪 在庫補充
3月21日	血液・生化学分析機 2台運用開始				
3月22日		通常業務に復旧	通常業務に復旧		センター職員来訪 在庫補充

東日本大震災後のリハビリテーション室の活動

Engineering Department
The Rehabilitation Room

The activities of the Rehabilitation Room after the Great East Japan Earthquake Disaster

I. はじめに

近隣医療機関の多くが被災し基幹病院として当院への依存が高まる中、宮城県災害拠点病院の一つとして職員が一丸となって災害医療に取り組んだ。当院での震災後より外来診療開始まで（3月11日～22日）のリハビリテーション室スタッフ（以下リハスタッフ）の活動及び今回の大震災を経験し見えてきた課題について報告する。

I. Introduction

As many nearby medical institutions had been affected, and the reliance on our hospital increased as a key hospital, all staff members worked on disaster medical care as one of the Miyagi Prefecture Disaster Hospitals. We are going to report on the activities of the staff of the Rehabilitation Room (hereinafter referred to as “Rehab-Staff”) in our hospital from immediately after the earthquake to the restart of our outpatient clinics (from March 11 to 22) and the challenges that have come to the fore after we experienced the great earthquake disaster.

II. 発災後の状況および対応

1. 発災直後

地震発生時、今まで感じたことのない非常に大きな揺れが長く続き、リハビリテーション室（以下リハ室）では引き戸ドアが左右に開閉する状況であった。リハ室及び病棟にて患者の治療に当たっていたリハスタッフは地震の揺れがおさまるまで患者の安全確保に当たり、その後リハ室に集合した。幸いリハ室内にいた患者と家族は全員無事であり、リハスタッフにも被害はなかった。リハ室内の被害状況を確認したところ、数ヶ所の壁に亀裂が入ったが、治療室及びスタッフ室内は治療機具やラック・本棚の倒壊はなく、収納されていた書籍や物品などが移動し煩雑化した程度だった。

II. Our situations and responses after the occurrence of the disaster

1. Immediately after the occurrence of the disaster

At the occurrence of the earthquake, extraordinarily large quakes that we had never felt before continued for a long time, and we were in a situation in which sliding doors were opening and shutting from side to side in the Rehabilitation Room (hereinafter referred to as “Rehab-Room”). The Rehab-Staff who were engaging in the treatment of patients in the Rehab-Room and some hospital wards tried to ensure the safety of patients until the earthquake subsided, and then they gathered in the Rehab-Room. Fortunately, the patients and their families in the Rehab-Room were all safe, and all the Rehab-Staff had no injuries as well. When we confirmed the damage situation of the Rehab-Room, several parts of the walls had cracked, but we did not have any falls of treating instruments, racks and bookshelves in the treatment room and the staff room, with only books and articles on the shelves having moved and shuffled to some extent.

次いで、余震により老朽化した建物が倒壊し、1 階病棟（整形外科）入院患者の避難経路の確保が困難になるおそれがあったため、看護師らと協力の下、同じフロアにある 1 階病棟入院患者を全員リハ室に避難誘導及び搬送した。自力歩行可能者（松葉杖など使用者含む）や車いす利用者だけでなく、術後のためストレッチャーでの移動を余儀なくされた患者もいた。しかし、全員がリハ室に避難してまもなく津波襲来により高層階へ患者を移送するという指示を受け、リハ室より階段を使って 2・3 階の外来ホールへの搬送を行った。車椅子患者は 4 人がかりで看護師や男性事務職員らと協力して搬送した。その後、待機場所にて整形外科及び脳外科入院患者の見守りや、わずかに配給となった非常食の食事介助などを行いながら次の指示を待った。同日夕方には再度 2・3 階より 1 階病室へ逆の手順で患者を移送し、この日はそのままほぼ全員がリハ室で翌朝まで待機した。病院外では津波による重油タンクの倒壊により沿岸部市街地が炎上していた。

Since there might be a risk of the decrepit building collapsing in aftershocks, which may inhibit the securing of evacuation routes of hospitalized patients on the 1st Floor Ward (an orthopedics ward); we, in cooperation with the nurses, guided and transferred all the inpatients of the 1st Floor Ward to the Rehab-Room on the same floor for evacuation. There were not only ambulatory patients (including crutch-users and the likes) and wheelchair users but also some patients who had no choice but to be moved by stretcher, as they had undergone surgery. However, soon after everyone had evacuated to the Rehab-Room, we received instructions to transfer our patients to the upper floors due to the tsunami. We transferred them to the outpatient halls on the



4 人掛かりで上の階に搬送

Transferring a patient to the upper floor among 4 members

2nd and 3rd floors via the stairs from the Rehab-Room. For each transfer of a wheelchair patient were 4 workers made up of nurses and male clerical members. After that, we were waiting in the waiting area for the next instruction while watching over the inpatients of orthopedics and brain surgery, assisting them in taking what little emergency food we had among other things. In the evening of the same day, the patients were transferred from the 2nd and 3rd floors to the 1st floor hospital room again, and almost all of them waited in the rehabilitation room until the next morning. Outside the hospital, the coastal areas of the city were in flames because of the collapse of heavy oil tanks caused by the tsunami.

震災翌日(3月12日)、当院には津波や火災から逃れた多くの患者が避難・搬送されてきており、リハスタッフはトリアージ後の軽症患者を一時避難先である当院に隣接する看護学校へ搬送に当



トリアージ後の車イス患者 を運んだ階段

A staircase through which we made our way with wheelchair-bound patients after triage

たった。この時にも下り坂や長い石段を車椅子患者は4人がかりで搬送した。リハスタッフ以外の職員の一部には、石段の降段時や20cm程の段差介助に戸惑う姿も見られ、車椅子介助法指導の必要性を感じた。また男性スタッフは救急車両の誘導にも協力した。夕方には外来部門の患者収容スペースがいっぱいとなり、リハ室をトリアージ後の患者の一時避難所として使用することになり、スタッフが交代で24時間体制にて対応した。

On the next day of the earthquake (March 12), many patients who had been able to escape from the fire and tsunami had evacuated or had been transferred to our hospital. The Reha-Staff took charge of transferring mild patients after triage to a temporal evacuation destination; the nursing school adjacent to the hospital. In the case of transferring wheelchair patients, we had four workers carry each patient down a long set of steps made of stones. Some staff of other departments were unsure of how to go about descending down the stone steps, navigating steps of about 20 cm in height, and felt the need for guidance in wheelchair assistance. Male staff members also cooperated in leading emergency vehicles. The accommodating space of patients in the outpatient clinic sector had become full of people in the evening, and a decision was made to use the Rehab-Room as a temporary shelter for patients after their triage, and our staff supported those patients 24 hours a day in shifts.

患者・家族を合わせてリハ室内避難者は12日41名、13日51名であり、治療用ベッドやマット、さらに長椅子なども利用して休んで頂いたが、必要数が足りずに中には床に敷きパッドだけを敷き横になったり、車椅子のまま過ごした患者もいた。ほとんどがトリアージタッグの判定分類「緑」と「黄」

の方であったが、介護を要する状態ながら家族の付き添っていない患者もあり、歩行介助やトイレ介助などの援助が必要であった。

The number of evacuees including patients and their family members in the Rehab-Room were 41 and 51 on March 12 and 13, respectively. Although we had them take rests by making use of therapeutic beds, mats and sofas, we did not have the required number of beds; some of patients laid out mat pads and laid down on them or spent time remaining in a wheelchair. Most of them were those with the ‘Green’ or ‘Yellow’ classification of triage, but some were not accompanied by their family members in spite of being in a state of requiring nursing care; so they needed assistance in walking, toileting and so on.



要介護者が滞在した ADL 室

The ADL Room where people dependent on care were staying

14 日午前にはほぼ全員が市内避難所や自宅に戻ったが、入れ替わり出産予定日間近の妊婦 3 名が入室となった。15 日未明には市街地の火災が当院の近くまで延焼していることと、2 機ある自家発電装置のうち 1 機が故障寸前になったことで、病院内全患者避難搬送も検討され、待機のリハスタッフは一時緊迫した状態であった。同日早朝の自家発電停止により妊婦 3 名は午前東北大学病院へヘリ搬送となった。16 日より 3 名の避難者が入室したが、2 名は体位交換やおむつ交換、経管栄養のチェック等が必要であった。しかしベッドもなく敷布団 1 枚のみでの臥床に、経管栄養注入時は毛布などを折りたたみ背当てにしてギャッジ姿勢を確保し対応したものの、臀部への圧迫は避けられず褥創悪化の原因となった。18 日、最後まで残っていた 2 名が当院入院となり、以後リハ室滞在者は 0 人となった。

Almost all of them returned to the evacuation center or home on the morning of the 14th, but three pregnant women who were about to give birth were admitted. Before dawn on March 15, the fire was drawing near the hospital, and one of our two in-house power generators was at its limits. In such a situation, the transfer of all hospital patients for evacuation was considered, and our tense Rehab-Staff were on standby. Due to the stop of the private power generator early in the morning on the same day, it was decided that the three pregnant women should be transferred to Tohoku University Hospital by helicopter. Three evacuees were admitted from March 16, two of whom were in need of repositioning, diaper changing and checking of tube feeding. However, we had no beds, so we made some beds with a mattress. We responded to the situation by keeping their head-up in position with things like blankets, which were folded and used as a back pad when injecting tube feeding nutrients. However, it could not prevent the pressure on the buttocks, causing deterioration of decubitus ulcers. On March 18, the last two people remaining in the

Rehab-Room were admitted to hospital, and the number of people staying in the Rehab-Room was zero since then.

表. リハ室避難者数の推移

	3/11	3/12	3/13	3/14	3/15	3/16	3/17	3/18	3/19
避難者数(人)	0	41	51	3	3	3	2	2	0

Table: Longitudinal Change in the Number of Evacuees in the Reha-Room

	3/11	3/12	3/13	3/14	3/15	3/16	3/17	3/18	3/19
The Number of Evacuees	0	41	51	3	3	3	2	2	0

2. 院内応援業務

市内の多くの医療機関が被災し連日多数の患者の対応に追われる中、他部門への応援業務は必須であった。3月16～21日は数人が交代で薬剤科での窓口業務(患者呼び出しや薬渡しなど)や救急外来での患者誘導業務に従事した他、一時栄養科へも出向き協力した。またこの頃には肺炎による入院患者が増加したことにより、病棟からの依頼を受けて言語聴覚士が口腔ケア業務にも当たった。

2. Our support service in the hospital

While our hospital was being pressed to respond to a large number of patients coming in every day because many medical institutions in the city had been affected, it was essential for us to support other departments. From March 16 to 21, some of us alternately engaged in the service window at the Pharmacy Department (such as patient calling and medication handing) and guiding patients at the Emergency Department. Some also assisted the Nutrition Department for a while. As patients hospitalized due to pneumonia had increased around that time, we accepted requests from hospital wards, and speech pathologists were also engaged in oral care services.

これと並行して、残るスタッフは入院患者の状態確認を行い、生活機能低下を予防するべく声かけや運動指導などで対応した。

At the same time, the other staff members checked the condition of hospitalized patients and supported them by doing things such as approaching them and guiding exercises in order to prevent the decline of living function.

Ⅲ. リハ室業務の再開

リハスタッフの入院患者への治療的介入は実際には発災6日目の3月17日からであり、目的は①精神的フォロー、②現在の状態の把握、③長期臥床による廃用症候群の予防及び改善である。

リハ室がまだ避難所として使用されていたため場所が限られ、関節可動域訓練や立ち上がり動作訓練など自主訓練指導を中心に行った。

III. The resumption of service of the Rehab-Room

The Rehab-Staff's therapeutic intervention to inpatients restarted from March 17, the 6th day of the disaster, and its objectives were (1) supporting the mental issues of the patients, (2) grasping their current condition and (3) preventing and improving their disuse syndrome caused by prolonged immobility. Since the Rehab-Room was still being used as a shelter, usage space was limited, and we mainly guided voluntary training such as training of the articular range of motions or that of standing-up motions.

リハスタッフとしては、院内のリハ処方患者以外にも廃用症候群発生及び進行予防を主目的に該当する患者の抽出を各病棟に働きかけたが、看護部門でも非常時による緊急対応のため対象となる患者を選択する余裕がない等、看護師のマンパワー不足と廃用症候群への認識が若干低下していた事などにより介入が不足した。

※ 通常業務は病院の一部外来診療再開に伴い3月23日より入院患者のみの対応で開始となった。

As Rehab-Staff, in addition to looking after our patients in rehabilitation, we approached each ward to select patients applicable to prevent the onset or progression of disuse syndrome. However, our intervention was inadequate as the nursing department could not afford to select patients due to dealing with emergency response, a lack of manpower and awareness of disuse syndrome, among other factors.

Regular operations started on March 23, with the resumption of outpatient clinics of the hospital, for inpatients only.

IV. 災害時におけるリハスタッフの役割

上述のように災害時の救急患者が殺到する状況においては、リハ室スタッフの役割は病院業務の補助が主であり、発災直後の避難誘導時は歩行可能者及び車椅子利用患者の搬送が中心になった。患者の機能状態に合わせた介助法の選択が要求されたケースもあったが、この点に関してはほぼ対応できた。

IV. The role of the Rehab-Staff at the time of disaster

As described above, in a situation under which emergency patients were rushing to our hospital at the time of disaster, the role of the Rehab-Staff was mainly to assist services of the hospital; transferring ambulatory and wheelchair patients became our major role at the time of evacuation. In some cases we were requested to choose a method of assisting according to the patient's status, and for the most part, we were able to respond.

また入院患者の廃用症候群進行予防への介入は時期が多少遅れながらも実施できたが、避難所などでの要介護者や要支援者への積極的な介入は困難であった。これは発災後肺炎による患者が増加したことなどにより、院内入院患者への対応が多く求められたためである。

※ 当地方にはリハビリテーション関連の支援として、避難所や在宅の要介護者・要支援者を対象に理学療法士及び作業療法士協会から多数の医療ボランティアや日本リハビリテーション関連 10 団体の方々の支援を頂いた。

On the other hand, we were able to perform some intervention in preventing the progression of disuse syndrome among hospitalized patients in spite of initial delays, but it was quite difficult to actively intervene among people requiring care or support in shelters. That was because we were often required to respond to the inpatients of the hospital partly due to the increase of the number of incoming patients with pneumonia after the disaster.

In regard to rehabilitation-related support in this area, a lot of medical volunteers from the Association of Physical Therapists and Occupational Therapists, and many members of 10 organizations related to the Japan Rehabilitation Society thankfully gave us support for people requiring care and support in shelters or homes.

V. 今後の課題

今回の大震災を体験し、リハ室としての今後の課題は以下の点である。

① リハ室としての災害時のマニュアル作りと定期的な防災訓練の実施

- 通常業務としての患者治療開始までの間、初動体制も含め何をするのかの役割を明確にすること。
- 災害の規模にもよるが可能な限り想定される状況下での勤務体制作りを行い、マンパワーの確保と同時に休息の取れる体制を準備すること。

V. Our challenges for the future

In experiencing the great earthquake disaster, we have listed future challenges of the Rehab-Room below.

1) Making of a disaster manual of the Rehab-Room, and periodic practice of disaster prevention drills

- We should make our roles clear, including what we should do and how we should initially respond until the regular service of patient care restarts.
- We should make a work system assuming expected conditions and prepare a system that allows time to take rest while at the same time, securing manpower.

② 職員への患者及び要支援者介助法の啓発

- 階段や段差昇降時の歩行介助方法及び車椅子介助法として車椅子ステッピングバー

の活用の仕方や車椅子からの転落の恐怖感をなくするため後ろ向きで降段するなど、介助方法の指導を行う。

2) Informing staff on assisting methods of patients and those requiring support

- We should instruct the staff of other departments in the hospital in assisting methods including how to assist patients in walking when they go up and down the stairs or bumps, how to make use of the stepping-bar of a wheelchair as a method of wheelchair assistance and how to go down the stairs backwards to curb patient's fear of falling from a wheelchair.

③ 病院内外における生活不活発病への介入の必要性

- 今後また災害が起こった時を想定し、避難所や在宅に残された要介護者や要支援者を把握し適切な医療を提供するなど、病院業務の遂行と合わせて可能な範囲での介入を検討する。

3) The need for intervention of disuse syndrome inside and outside of the hospital

- Assuming a disaster happens again in the future, we should consider intervention, such as grasping people requiring care and support those who have been left in shelters or homes and providing appropriate medical care, to the extent that we can practice alongside our service at the hospital.

VI. おわりに

被災後 8 ヶ月が経過し、院内各部署は通常業務にもどり震災当時の慌しさは記憶に残るのみである。しかし今後も大地震の可能性が指摘されている以上、今回の大震災での経験を忘れることなく災害時の対応をしっかりと考えておくことが重要である。

VI. In Conclusion

Eight months have passed since the disaster, each department in the hospital has returned to its regular service, and the rush at that time of the earthquake disaster remains as a memory. However, since the possibility of a major earthquake in the future has been pointed out, it is important to firmly reflect on our disaster response without forgetting our experience of this earthquake.

今後は個人個人が常に災害時を想定した意識を持ち、また全体としても『リハ室として何ができるのか？』、『何をすべきか？』の課題に向き合いながら業務を遂行していきたいと考える。

From now on, each of us should always assume a disaster could strike, and we would like to continue accomplishing our services while also assessing what we can and should do as the rehab-room.



スタッフ

震災当時は9人

Our staff

There were 9 members during the disaster.

震災発生後の ME センター業務記録

Engineering Department
The ME Center

The ME Center Service Records after the occurrence of the earthquake disaster

震災発生時及び、震災以降透析センター状況

透析センターでは透析患者総数 168 名の治療に、月水金・昼透析 66 床、夜間透析 35 床ならびに火木土・昼透析 66 床を看護部 25 名、技師 5 名で業務を行ってきた。

3 月 11 日、震災当日、透析センターでは看護部 16 名、技師 3 名が勤務しており、62 名の患者が透析を行った。

震災発生時は、ほとんどの患者が透析を終了し帰宅しており、外来 3 名、入院 1 名が透析中であったが地震発生直後、透析を中止した。

The situation at the Dialysis Center at the occurrence of and after the earthquake disaster

In order to treat our 168 dialysis patients in the Dialysis Center, 25 workers of the nursing section and 5 engineers had performed daytime dialysis (66 beds) and evening dialysis on Mondays, Wednesdays and Fridays (35 beds), and daytime dialysis (without evening dialysis) on Tuesdays, Thursdays and Saturdays (66 beds).

On the day of the earthquake disaster, March 11, 16 workers of the nursing section and 3 engineers were at work, and 62 patients underwent hemodialysis at the Dialysis Center.

At the time of the occurrence of the earthquake, most of the patients had gone back home after their dialysis, 3 outpatients and 1 inpatient were on dialysis, which was discontinued immediately after the earthquake.

その後、準夜勤務看護師 7 名、技師 1 名が加わり、看護師 23 名、技師 4 名で透析センターに来ることができた夜間透析の透析業務、被災により透析ができなくなった他施設からの患者受入れ業務、安全な場所への入院患者移動業務をおこなった。

3月12日以降、緊急避難時にスタッフが対応できる患者数を検討し、また、電力・水の供給を考慮し透析時間を短縮(通常4時間透析を2時間透析)、治療する透析監視装置数を1クール40床に限定した。3月12日から3月19日まで、月水金3クール透析、火木土2クール透析で行った。

この間の勤務体制は、緊急避難・緊急透析に備え24時間体制とし、3月19日まで行った。

From there, 7 nurses of evening shift and 1 engineer came to join. 23 nurses and 4 engineers were carrying out duties such as dialysis services for evening dialysis patients who had been able to come to the Dialysis Center, accepting patients who had come from other facilities that had no longer been able to perform dialysis due to the disaster and the transferring service of inpatients to safer places.

After March 12, we looked into the number of patients our staff could respond to in an emergency evacuation, took into consideration the supply of electricity and water, decided to shorten dialysis time (from usual 4 hour-dialysis to 2 hour-dialysis) and restricted the number of active dialysis monitoring devices to 40 beds per course. From March 12 through March 19, we carried out 3 courses of dialysis on Monday, Wednesday and Friday, and 2 courses of dialysis on Tuesday, Thursday and Saturdays.

Our work shift during this period of time was set to 24 hours a day in preparation for emergency evacuation and emergency dialysis, which continued until March 19.

震災発生時機器状況

透析監視装置66台、多人数用透析液供給装置3台、逆浸透精製水製造装置2台、A剤自動溶解装置2台、B剤自動溶解装置2台あり、地震発生後各機器が地震を感知し一斉に警報を発し自動停止した。電力供給は地震直後の停電時に自家発電に切り替わり、全ての機器に電力供給され各機器の警報を解除し、その後全ての機器の転倒、故障の確認作業を行って、全て異常が無い事を確認し透析監視装置を除く機器の運転を再開した。

3月15日に通常電源が復旧するまで、消費電力を抑えるため透析監視装置1日使用台数を40台とし、時間を短縮して透析をおこなった。

The condition of our equipment at the occurrence of the earthquake

We had 66 dialysis monitors, 3 dialysis fluid suppliers for many patients, 2 units of purified water producers by reverse osmosis, 2 automatic dissolving units of A-agent (powder for dialysate) and 2 automatic dissolving units of B-agent (powder for dialysate), each of which sensed quakes after the occurrence of the earthquake, raised alarms in unison and automatically stopped. The power supply automatically switched over to private power generation at the time of the power outage immediately after the earthquake, and power was supplied to all of the equipment. We released the alarm of every apparatus and then checked for falls and failures. After we confirmed that there were no defects, we resumed the operation of those apparatuses except dialysis monitors.

Until March 15, when the normal power was restored, the number of the dialysis monitors to be used per day was set to 40 in order to reduce power consumption, and we carried out dialysis by shortening its time.

2003 年 5 月三陸南地震、7 月宮城県北部地震の時、被災地の透析施設において透析機器が転倒し透析ができなくなった事例があった。以降機器メーカーと連携をとり透析監視装置全てに耐震シートを設置し(写真 1)、多人数用透析液供給装置等の転倒防止策として装置間に鉄のバーを設置した(写真 2)。また、バーを設置できない機器には固定器具を使いコンクリートの床に打ち込み固定した。これらの転倒防止策を実施した結果、この震災において器機の転倒、故障はなかった。

At the time of the Sanriku-Minami Earthquake in May, 2003 and the Northern Miyagi Prefecture Earthquake in July, 2003, there were cases where dialysis could not be carried out due to dialysis apparatus' s falling down in dialysis facilities in affected areas. After that, as a precaution, we placed earthquake-resistant sheets under all dialysis monitors in cooperation with apparatus manufacturers (Photo 1) and set up iron bars between apparatuses such as dialysis fluid suppliers for many patients to prevent falls (Photo 2). Also, in regards to some pieces of the apparatus where the bars could not be fixed, we used fixing devices to fix them into the concrete floor. We had carried out these prevention measures against falls, consequently having no falls or failure of apparatus' during this earthquake disaster.

写真 1 Photo1



写真 2 Photo2



震災発生後の業務

1. 医療物品確保

震災発生直後の透析患者様 168 名に必要な医療物品

- ダイアライザー(人工腎臓・10 日分 1000 本)

- 血液回路 7 日分 (630 セット)
- 透析液 5 日分 (66 箱)
- 抗凝固剤 10 日分 (800 本)
- 生理食塩水 8 日分 (750 本)
- 透析用穿刺針 8 日分 (1500 本)

全てが揃わなければ透析ができず、通信・入荷手段が途絶えた状況の中、透析液の確保が困難であった。業者来院にて透析に必要な物品を依頼し、3 月 14 日に 2 日分、3 月 15 日に 7 日分、3 月 17 日に 3 日分、3 月 18 日に 2 日分あわせて、約 2 週間分の医療物品を確保した。

Our service after the earthquake disaster

1. Ensuring medical articles

Medical articles required for 168 dialysis patients immediately after the earthquake disaster

- dialyzers (artificial kidneys for 10 days, 1,000 columns)
- blood circuits for 7 days (630 sets)
- dialysate for five days (66 boxes)
- anti-coagulant for 10 days (800 vials)
- saline for 8 days (750 bottles)
- puncture needles used for dialysis for 8 days (1,500 needles)

We could not carry out dialysis unless all of the above were prepared; it was difficult to secure dialysate in a situation where communication and arrival means were cut off. We took the opportunity to request the goods necessary for dialysis when suppliers' came to visit, ensuring medical goods for about 2 weeks in total: those for 2 days on March 14, for 7 days on March 15, for 3 days on March 17 and for 2 days on March 18.

2. 北海道、他県への避難透析準備

余震が続き、ライフラインが途絶えた被災地での治療は困難と医師が判断し、北海道・他県への避難透析を決定した。3 月 15 日から全透析患者様の被災以降の通院手段、住居の被災状況、患者様・ご家族の状況を調査し資料を作成した。3 月 19 日、北海道 24 施設へ 78 名の広域搬送をおこなった。更に、3 月 23 日までに他県へ 15 名の搬送をおこなった。

2. Preparing to restart dialysis after evacuation to Hokkaido and other prefectures

Aftershocks were continuing. Our doctors decided that the treatment in the affected area, where the infrastructure was cut off, was difficult, and determined an evacuation to Hokkaido and other prefectures. From March 15, we asked every dialysis patient their means of transport to the hospital, the disaster situation of their residence and the situation of each patient and family after the disaster, and created data. On March 19, we carried out the wide-area transport of 78 patients to 24 facilities in Hokkaido. In

addition, we had carried out the wide-area transport of 15 patients to other prefectures until March 23.

今後の対策

今後、情報に関しては MCA 無線の活用を充実させる。機器に関しては装置連結バー・打ち込み固定具の定期点検、透析監視装置耐震シートの定期交換を行い、また、医療物品に関しては、日常業務での管理を更に徹底することが重要と思われた。

Future measures

In future, we will enhance practical use of the MCA radio in regards to information. We will carry out periodic checks on the connecting bars between the apparatus and devices for fixing. It is important that we completely manage daily operations of medical articles further.

3.11震災記録 (3月11日～3月23日)

		3月11日 (金)	3月12日 (土)	3月13日 (日)	3月14日 (月)	3月15日 (火)	3月16日 (水)	3月17日 (木)	3月18日 (金)	3月19日 (土)	3月20日 (日)	3月21日 (月)	3月22日 (火)	3月23日 (水)
透析時間	透析コール	2コール 3h	2コール 3h	1コール 2h	3コール 2h	2コール 2h	3コール 2h	2コール 2h	3コール 2h	2コール 2h	—	1コール 4h	1コール 4h	1コール 4h
	患者総数	163	163	173	177	178	178	163	163	90	83	83	83	75
	昼の部(9:30～)	133	79	14	103	67	100	67	98	69	—	48	38	48
	夜の部(17:00～)	35	—	—	—	—	—	—	—	—	—	—	—	—
3.11災害による死亡		2												
病								1				1		
他施設移送中死亡														
他施設からの 受入患者	施設名	南三陸1 高田2	南三陸2 高田2	南三陸 5	南三陸 4	南三陸 1	地の蔵クリ (大船渡)							
	患者数	3	4	5	4	1	1							1 (千歳船橋)
他施設への 避難患者	避難先													
	患者数													
他施設への 自主避難患者	避難先	宮城 (中新田)						秋田1 山形1				岩手1 山形1		
	患者数	1						2			2	4		8
情 報 収 集														
3月13日以降：TVニュースにて仙台市関係施設情報得る。3月15日：岩手県46透析施設情報FAXにて得る。3月17日：社保よりDr. 看護局並院にて情報交換。3月14日以降：Drがメール及び、携帯電話で東北大学病院と連絡。その他、3月11日以降携帯電話がつかず各メーカー、代理店兼院にて情報得る。														
① 3月11日 地震を感じし 警報発生→警報解除→停電により自家発電切替→各機器の転回無・異常無・故障無→全ての機器確認後→運転再開														
14:46～自家発電切替														
緊急医療物資供給	透析装置	66台												
	水処理装置	4台												
	透析液供給装置	3台												
	透析液回収装置	5台												
電源供給状況														
バイタネット	ダイアライザー		150本						150本					
	透析器		100箱						37箱					
ムサシ	生食		650本											
	ヘパリン		1500本						500本					
テクノ	ダイアライザー					576本		240本						
	血液回路					144セット		24セット					480セット	
テクノ	透析剤					7000本		3500本						
	透析剤					444本								

栄養管理室の記録

The Nutrition Management Room

The documentation of the Nutrition Management Room

【はじめに】

当院は、気仙沼2次医療圏の中核病院としての役割を担っており、平成9年に宮城県災害拠点病院に指定された。栄養管理室は災害に備える目的に非常用備蓄食品マニュアル(資料1)を作成した。

ところが今回の大震災は、マニュアル作成時の想定をはるかに超えた被害をもたらすものであった。備蓄食料が少なく器具も十分に使用できない状況の中、どのようにして1日3度の食事を提供するかと頭を悩ませた。震災を乗り越え通常業務に戻った今、当時の状況を振り返って、いつ襲来するかもしれない自然災害に対して災害拠点病院の栄養管理室にはどのような準備が必要かを検証したい。

[Introduction]

Our hospital is a core hospital in the secondary medical area of Kesennuma and has been designated as one of Miyagi Prefecture's Disaster Hospitals since 1997. The Nutrition Management Room created a manual for emergency food stockpiles in preparation for disasters (Appendix 1).

However, this earthquake caused damage that far exceeded our assumptions at the time of the manual's creation. In a situation where there was not enough food and we could not use equipment adequately, we tirelessly contemplated how we were to supply three regular meals a day. We have now overcome the earthquake disaster and have resumed our regular service. Reflecting on the situations at that time, we would like to consolidate what kind of preparation will be required as the nutrition management department of a disaster hospital as we cannot know when a disaster will strike again.

【栄養部門の被害状況と対応】

平成 23 年 3 月 11 日、夕食準備中にその時は訪れた。

栄養管理室厨房は旧棟の地下にあり、大地震で圧壊する危険性を指摘されていた。厨房内は多少の地震では揺れを感じない為、事務所にいる栄養士が揺れを感じた際は「地震！火を止め元栓を閉めて！」と叫ぶことにしている。この日の地震は、なかなか揺れがおさまらず、地下の厨房や事務所にいるのは危険であると判断し、総務部の指示に従って避難を開始した。厨房は停電となり、ガスも使えない状態であった。厨房が使用不可能となった時には、4 階食堂を利用することになっており、すぐに移動を開始した。エレベーターは既に使用できなくなっていたので、階段を何度も往復して、3 階の新病棟に備蓄してある食料や物品を 4 階食堂に集めた。

[The damage situation of the Nutrition Service Department and our response]

On March 11, 2011, it was during our dinner preparations when the disaster struck.

The kitchen of the Nutritional Management Room is located in the basement of the oldest building, and the risk of collapse in a large earthquake had been pointed out prior. Since workers in the kitchen almost always do not feel shaking of moderate earthquakes (due to the strong ground), we decided that nutritionists should yell out “Earthquake! Stop using fire and close the main valves!” when anyone in the office feels tremors. The earthquake of that day did not let up, and we judged it was dangerous to stay in the kitchen and the basement office and started to evacuate according to the instructions of the General Affairs Department. Power failure occurred in the kitchen, and we could not use city gas in the given situation. A decision was made to use a cafeteria on the 4th floor in the event that the kitchen becomes unusable, so we started moving there immediately. As we could no longer use the elevators, we went up and down the stairs multiple times to collect foods and goods having been stockpiled on the 3rd floor of the new building into the cafeteria on the 4th floor of the same building.

食数の管理に対しては、オーダーリングによる取り込みが不能となり、当日朝に印刷してあった全患者の食事配膳一覧表をもとに名前を書き出していたが、新入院や食事変更により患者の把握が難しくなったため、食出しの締切時間を決めて、その都度病棟から必要な食数を連絡してもらうことにした。被害状況と対応は、下記の通りである。

In terms of managing the number of meals, computer ordering became unavailable, so we were writing names on the meal-catering list of all patients, which had been printed out in the morning that day. However, as it became difficult to grasp our patients due to new hospitalizations and meal changes, we decided a deadline of meal ordering and had each ward tell us the number of meals required each time. The damage situations and our responses were as follows.

ガス 地震直後に供給停止したため、備蓄品カセットコンロを使用。12 日には気仙沼市ガス水道部ガス課から炊き出し用ガスコンロを 2 台借りて 4 階食堂に設置した。13 日には応急処置として、地下厨房のガス台が使用できるように、都市ガスからプロパン用調理器具に交換した。この日から、朝食は 4 階食堂で、昼食夕食は地下厨房で調理した。25 日にガスが全面復旧した。

Gas Because the supply of city gas stopped immediately after the earthquake, we started to use the cassette stoves from our stockpiles. On March 12, we borrowed two stoves for supplying food from the Gas Division of the Kesennuma Gas Water Department and set them in the cafeteria on the 4th floor. On March 13, in order to make the gas stoves of the basement kitchen available as first aid, we switched cooking utensils using city gas with those that use propane gas. Since that day, we had been cooking breakfast in the cafeteria on the 4th floor, lunch and dinner in the basement kitchen. City gas was fully restored on March 25.

水道 貯水槽の水は使用できたが、節水に心がけた。

電気 自家発電装置が機能した。15 日に商用電源が通電し、エレベーターの使用は点検後の 16 日から可能となった。厨房内の機械は地震により損壊している可能性があり点検が必要で、しばらくコンベクションオーブン等は使用できなかった。

地下厨房の機能が全面復旧したのは 3 月 30 日であった。

3 月 31 日	食器対応(献立内容は流通の関係で調整)
4 月 5 日	流動食にも対応
4 月 6 日	給食オーダー、食札発行再開
4 月 7 日	味噌汁薄味対応
4 月 8 日	牛乳供食
4 月 20 日	通常通りの献立に完全復旧

Tap Water Although water in our cisterns on the roofs were available, we tried to save water.

Electricity Our in-house power generators kept their function. On March 15, commercial power supply was restored, and elevators became available after inspection from March 16. The equipment in the kitchen needed to be inspected because the earthquake might have damaged it, so we could not use equipment such

as convection ovens for a while.

It was on March 30 that the function of the basement kitchen was fully restored.

March 31	Arranging tableware (menu contents were adjusted in relation to the distribution of ingredients)
April 5	Starting to prepare liquid diets
April 6	Restarting hospital meal orders and issuing menu cards
April 7	Starting to prepare miso soup with a slightly salty taste
April 8	Supplying milk
April 20	Full recovery of usual meal contents

【食料・食材料の入手法と食事内容】

震災前に規定した非常用備蓄食品マニュアルを資料 1、非常用備蓄購入品目を表 1、非常用備蓄食品を表 2 に示した。

震災当日の夕食は非常食と冷蔵庫にあった牛乳で対応したが、震災時、入院患者は約 350 人おり、備蓄していた非常食は瞬時に枯渇することになった。食品は最低限の 1 日分しか備蓄していなかった。米は震災前日に 4 日分納品されており、野菜や牛乳も翌日の使用分が納品されていたが、これらを切りつめても 3 日もつかどうかという状況であった。

震災時の食事一覧を表 3 に示した。

[The method for obtaining foods and foodstuffs, and meal contents]

The manual of emergency food stockpiles that had been defined before the earthquake disaster is shown in Document 1, the purchasing items of emergency stockpiles in Table 1, and the foods of emergency stockpiles in Table 2, respectively.

Supper on the day of the earthquake was emergency foods and milk from the refrigerators. However, about 350 inpatients were in the hospital at the time of the earthquake disaster, which instantly depleted the emergency food of our stockpiles. We had stockpiled only a minimum supply of food for a day. The 4 days' worth of rice had been delivered on the day before the earthquake, and vegetables and milk for the following day's use had also been delivered, but the situation was such that we were not sure if those foods would be enough for the 3-day supply even if we cut down the portions.

The list of meals at the time of the earthquake disaster is shown in Table 3.

当日夕食は調理ができず、備蓄のパンやレトルトお粥と牛乳を提供するのが精一杯だった。津波により道路が寸断されて、物流はいつ回復するのか全く情報が届かず、加えて、地元の業者も

被災しているため市場に出回る品種は著しく制限されていた。食材が枯渇する不安を抱えて、冷蔵冷凍庫に残っていた在庫を使い、また調理方法やディスプレイ食器の数も限られた状態で、工夫をしながら食事の提供を行った。

On the day of, we could not cook supper, and all we could do was provide some bread, some retorted rice gruel and some milk that had been stored. The tsunami had cut off traffic at many places along roads, and we could hardly get information about when logistics would recover at all. In addition, varieties on the market were severely limited because local suppliers had also been affected. We had anxiety about foods being depleted and made use of the stocks that had been left in the refrigerating cabinets. The situation limited the number of cooking methods and disposable tableware, and we provided meals as we went along.

3 日目には米の在庫が減り、2 個ずつ供給していたおにぎりを 1 個ずつに減らした。地震発生後 4 日目になって少しずつではあるが、救援物資が届くようになった。メディアを利用して米の必要性を訴えたところ、5 日目に秋田県の個人の方が軽トラックで米を 600kg、直接当院に届けてくださり、感動で涙したことを忘れることができない。

On the 3rd day, our rice stock got smaller, and we reduced portions of the two rice balls we had been providing, to one to each person. On the 4th day after the earthquake, the delivery of relief supplies begun little by little. After our hospital appealed the need of rice by using the media, a person in the Akita Prefecture thankfully delivered 600 kg of rice directly to our hospital by a small truck on the 5th day, and we cannot forget how we were moved to tears.

食材の中では、果物などは比較的早期に入手することができ、また、野菜は近くの八百屋からなんとか納品してもらえる状態ではあった。牛乳・ヨーグルト類がなかなか手に入らず、3 月 28 日に 200mL の豆乳パックを大量購入した。提供する食種は、ごはん(献立によりパン・麺・カロリーメイト等)か、お粥の 2 択とした。卵・魚アレルギー患者については、対応した副食を提供できた。経管栄養は、アイソカル®・プラス(Nestle Nutrition)に塩を添加するケースのみ対応し、その他はラコール配合経腸用液(株式会社大塚製薬工場)に変更してもらった。PG ソフト®EJ・PG ウォーター®EJ(テルモ)の在庫は病棟に管理をお願いした。

Among foodstuffs, we were able to obtain fruits at a relatively early stage, and vegetables could somehow be delivered from nearby grocery stores. We could not get foodstuffs such as milk and yogurt as easily, so we bought large quantities of 200 mL packs of soymilk on March 28. We set the alternative of rice (bread, noodles, CalorieMate®, etc. depending on our menu) or rice gruel for food categories we would provide. Concerning egg or fish allergy patients, we were able to provide side dishes considering those allergies. With regard to tube feeding, we responded only to some cases in which we added some salt to Isocal Plus® (Nestle Nutrition), and in

other cases, we asked for changing to Racol Liquid for Enteral Use® (Otsuka Pharmaceutical Factory). We asked the hospital wards to manage the storage of PG Soft® EJ and PG Water® EJ (Terumo Corp.).

【今後の課題】

厚生労働省は災害拠点病院の指定要件として、準備する食糧の備蓄量を 3 日分程度求めると発表した。経験では救援物資が届くようになったのは震災後 4 日目であり、3 日分の備蓄量という数値は妥当なものと思われる。備蓄内容は、長期保存できるアルファ米（保存可能期間 5 年）やサバイバルフーズ（同 25 年）を加えること、また、今回提供できなかった流動食やミキサー食などに対応できる食品を備蓄リストに加えたい。アレルギー食の確保も大きな課題である。また、保管場所やコストの問題をクリアできれば、職員や付き添い家族などに対する食糧備蓄も検討しなければならないと考えられた。

給食材料の入札条件に、非常時の優先納入を確保する項目を加えたい。更に、他病院や近隣業者との連携を整備しておくことも極めて重要である。

[Future challenges]

The Ministry of Health, Labor and Welfare states that one of the assignable requirements for a disaster hospital is that there should be about 3 days of food stockpiles. Our experience tells us that it was the 4th day after the earthquake when relief supplies came to reach our hospital, so the number of 3 days' worth of stockpiles seems reasonable. As for the contents of stockpiles, we should add alpha rice (5 years of shelf life) and Survival Foods (25 years of shelf life), which can be stored long term, and we would like to add liquid diets, mixer foods and others to our stockpile list, which we could not provide this time. Storing allergy foods is also one of the major issues. In addition, if we can clear the problem of storage location and its cost, we must also take into consideration food stockpiles for the staff members, attendant families and others.

We'd like to add an item to the bidding conditions in order to secure priority delivery of meals during an emergency. Furthermore, it is extremely important to cooperate with other hospitals and neighboring suppliers.

【おわりに】

当院の栄養士は 5 名である。11 日は 1 名公休であったが、地震発生後すぐに出勤し早い段階から 5 名で活動できた。朝は 5 時半から委託業者と共に準備をし、空き時間には、少ない在庫で調理できる献立作成に頭を悩ませ、3 月 25 日まで病院に泊まり込んだ。栄養管理室の職員の被害状況は、家が津波で流出したもの 1 名、車の水没 3 名であった。何よりも、家族や子供たちの心配を

しながら仕事をしなければならない事が辛かった。私達だけではなく、誰もが同じ状況であったが
…。

[Conclusion]

We have 5 nutritionists at our hospital. On March 11, one person was on her holiday, but she came to work immediately after the earthquake. So, we could cover our duties with our five staff from the early stages of the disaster. We made preparation for meals along with our contractors from 5:30 every morning. In our vacant hours, we worked our brains to plan meals that we could cook with less stock, and stayed in the hospital until March 25. The damage status of our staff members of the Nutrition Management Room was that one staff had lost her house to the tsunami and 3 staff's cars were submerged. More than anything, it was difficult for us to work while we were worrying about our family and children. However, it was not only us, everyone was in the same situation.

震災当日、委託している調理・洗浄部門の方々が、病院を離れることなく遅くまで手伝って下さった。翌朝早番で出勤しようと病院に向かったものの、道路が寸断され辿りつけなかった方もいた。配膳にはエレベーターを使用できなかったので出来るだけ人手が欲しかったが、車の水没、家庭の事情などで出勤できない事情もあり、委託業者も人員確保には苦労したようであった。

On the day of the earthquake, the contractors of the Cooking and Tableware Washing Section came to help until late at night without leaving the hospital. Some staff had headed to the hospital to try and work the early shift of the next morning, but ended up not reaching the hospital due to road disruption. We required as many hands as possible for setting the tables because we could not use the elevators, but the contractors also appeared to be struggling with staff shortages due to their circumstances that prevented them from coming to the hospital, such as the submergence of their cars and personal reasons.

行政から支援が到達するまでの間、私たちを支えてくれたのは民間の有志であった。物流が安定するまでの間、約 1 ヶ月にわたり支援物資に頼っての調理が続いたが、幸いにして入院患者のみならず、災害医療を支えるスタッフにも食事を提供することができた。今回の震災から、私達は多くのことを学んだ。この経験をこれからの業務や危機管理に生かしていきたい。


Until the support of administrative bodies arrived, it was private volunteers that had supported us. Over a period of one month or so until logistics became stable, we kept cooking relying on relief supplies, but fortunately we could provide meals not only for our inpatients but also for the staff, who were supporting disaster medical care. We have learned a lot from this earthquake disaster. We would like to make the best use of this experience for our future service and crisis management.

非常用備蓄食品マニュアル

1. 対象者 患者
2. 備蓄食数 500 人
3. 備蓄日数 1 日分（最低限）
4. 備蓄食品条件
 - ① 水道、市ガス、食器等がなくても使用できる。
 - ② 保存が簡単で長期間保存できるもの。
 - ③ 日常の献立に取り入れられるもの。

Appendix 1

The Manual of Foodstuffs Kept in Case of Emergency

1. Subjects: patients
2. The number of stockpiled foodstuffs: for 500 patients
3. The number of days for which our food stocks can provide: at least enough for one day
4. The conditions that stockpiled foodstuffs need to meet
 - 1) Foodstuffs that can be cooked and used without tap water, city gas, tableware or the likes
 - 2) Foodstuffs that can be stored both easily and also for a long period of time
 - 3) Foodstuffs that can be incorporated into the ordinary meals
5. 予算
 - ① 給食材料費以外の経費で運用する。 現在は、給食材料費で運用
 - ② 毎年、次年度予算時期に見直しをする。
6. 備蓄場所及び管理
 - ① 場所 3 階新病棟
 - ② 管理
 - A 栄養管理室が行う。
 - B 帳簿を作り出納を記録する。
 - C 献立で使用する場合は、使用前日までに購入し在庫数を常に一定にして置く。

5. The budget

1) Stockpiled foodstuffs should be applied as expenses except those for foodstuffs for regular meals.

meals expenses  They are currently under foodstuffs for regular meals expenses

2) Review expenses during the time when we determine the next fiscal year budget.

6. The location of stockpiles and its management

1) Location The 3rd Floor Word in the new building

2) Management


A: The Nutrition Management Room manages the stockpiles.

B: We keep the books and record the balance.

C: When we use them in a menu, we should buy new ones a day before their use and always keep the number of stockpiles constant.

7. 調理する場所

栄養管理室厨房が使用不可能の場合

① 院内  「公友会食堂」「栄養指導室」「多目的室」

② 院外  未設定

8. 献立及び備蓄食品


別紙記入

9. 食品以外の備蓄品

別紙記入

7. The locations for cooking

In case that the kitchen of the Nutrition Management Room is unavailable

1) Inside the hospital  the Staff's Cafeteria, the Nutrition Counseling Room or the Multipurpose Room

2) Outside the hospital  not set

8. Menus and stockpiled foods

Refer to the attached sheet

9. Other stockpiles except foods

Refer to the attached sheet

表 1

非常用備蓄購入品目

品 名	数 量
飯 (デイスポ食器)	3600 個
副菜用 (デイスポ食器)	3600 個

カップ（味噌汁用） 身	（ディスポ食器）	4000 個
カップ（味噌汁用） 蓋	（ディスポ食器）	4000 個
カップ 身	（ディスポ食器）	2000 個
カップ 蓋	（ディスポ食器）	2000 個
ディスポスプーン	（ディスポ食器）	2000 個
卓上コンロ		15 台
燃料（カセットボンベ）		30 組
やかん（6 L）		10 個
割りばし		4200 膳
手付ビニール袋		4000 枚
ゴミ袋		700 枚
タオル（白）		60 枚
サランラップ		40 本
アルミホイル		40 本
チャッカマン		5 本
フィットバンド（L）		2000 枚

Table 1 **The Items to be Stockpiled in Case of Emergency**

Items	The Amount
Disposable rice bowls	3600
Disposable bowls and plates for side dishes	3600
Disposable cups for miso soup (cup-parts)	4000
Disposable cups for miso soup (cap-parts)	4000
Disposable cups (cup-parts)	2000
Disposable cups (cap-parts)	2000
Disposable spoons	2000
Stoves for desktop use	15
Fuel (cassette cylinders)	30
Kettles (6 L)	10
Disposable wooden chopsticks (pairs)	4200
Plastic bags with a handle	4000
Dust bags	700
Towels (white)	60
Plastic wrap (rolls)	40
Aluminum foil (rolls)	40
Ignition devices [Chakkaman [®]]	5

Fitting bands (L size)	2000
------------------------	------

表 2

非常用備蓄食品

品 名	数 量
水	無
カロリーメイト ロングライフ	1020 箱
毎日果実	85 袋
マクトンビスキー	28 箱
パンの缶詰	384 缶
みかん缶	125 缶
白かゆ	160 袋
梅干し (1kg)	10 箱
凍り豆腐	15 袋
なめこ缶	25 缶
りんごジュース	510 本
オレンジジュース	510 本
さんまかば焼缶	200 缶
シーチキン L	90 缶

Table 2


The Foods to be Stockpiled in Case of Emergency

Items	The Amount
Water	No
Caloriemate® [Long life] (boxes)	1020
Everyday-Fruits® (bags) [fruit juice]	85
MactonBisckie® (boxes) [biscuits]	28
Cans of bread (cans)	384
Cans of mandarin oranges (cans)	125
White rice porridge (bags)	160
Pickled umes (1kg) (boxes)	10
Freeze-dry tofu (bags)	15
Cans of Nameko-mushrooms (cans)	25
Apple juice (bottles)	510
Orange juice (bottles)	510
Cans of broiled pacific sauries (cans)	200
Cans of tuna-meat (Seachicken L) (cans)	90

表 3

食 事 一 覧 表

		朝	昼	夕	備 考
3/11 (金)	常食 全粥			パンの缶詰 牛乳	<ul style="list-style-type: none"> ○経管栄養は、ラコール・静脈栄養に変更してもらう ○食事オーダーが出来ないので朝の名簿を印刷していたものを参考に名前を書き出し配膳 
	流動 三分五分			レトルト粥 牛乳	
	職員				
3/12 (土)	常食 全粥	カロリーメイト りんごジュース	おにぎり2個 ゆで卵1個 (パック塩0.5g) 漬物・いちご2粒 お茶(ペットボトル)	おにぎり2個 さんま蒲焼1/2缶 漬物・ぶどう3粒	<ul style="list-style-type: none"> ○昼～粥は鍋で炊く。 ○昼に市ガスより炊き出し用プロパンガス2台届き食堂で使用開始 ○アレルギーの方のみ対応する ○夕食よりディスプレイ容器使用 ○お茶(ペットボトル)は売店から提供 
	流動 三分五分	レトルト粥+梅干し りんごジュース	粥+梅干し ゆで卵1個 (パック塩0.5g) 漬物・いちご3粒 お茶(ペットボトル)	粥+梅干し さんま蒲焼1/2缶 漬物・ぶどう3粒	
	職員		ゆで卵 (パック塩0.5g)		
3/13 (日)	常食 全粥	カロリーメイト みかんジュース	おにぎり1個 なす焼き(生姜醤油) いちご2粒 お茶(ペットボトル)	おにぎり1個 ほうれん草お浸し 卵焼き又は とり肉八幡巻き みそ汁(豆腐・にら・もやし)	<ul style="list-style-type: none"> ○地下厨房の一部ガスコンロをプロパンガス使用可へ変換してもらう(一部ガス台使用可) ○米が無くなりそうなので、おにぎり2個から1個で対応 
	流動 三分五分	粥+梅干し みかんジュース	粥+梅干し なす焼き(生姜醤油) いちご2粒 お茶(ペットボトル)	粥+梅干し ほうれん草お浸し 卵焼き又は とり肉八幡巻き みそ汁(豆腐・にら・もやし)	
	職員		なす焼き(生姜醤油)		
3/14 (月)	常食 全粥	マクトンビスキー みかんジュース	おにぎり1個 ポテトサラダ バナナ1/3又は ぶどう3粒	ごはん 野菜炒め 漬物 りんごゼリー	<ul style="list-style-type: none"> ◎午後近くのお店より物資等届く 冷凍食品会社より物資が届く ◎菓子パン届く(ヤマザキ) ○食数の締切時間を設け御飯と粥の食数を病棟より連絡もらう(食数の把握が難しい為)
	流動 三分五分	粥+のり佃煮 みかんジュース	粥+たいみそ ポテトサラダ バナナ1/3又は ぶどう3粒	粥+たいみそ 野菜炒め 漬物 りんごゼリー	
	職員				

		朝	昼	夕	備 考
3/15 (火)	常食 全粥	菓子パン ジュース	カロリーメイト ゼリー類	おにぎり メンチカツ 甘夏	◎米600kg届く (秋田の方より) ★電気13:30 通電 (エレベーターは点検後稼働)  メンチカツ・甘夏
	流動 三分 五分	粥+梅干し ヨーグルト	粥+のり佃煮 ゼリー類	粥+ねりうめ さばの味噌煮 甘夏	
	職員			メンチカツ	
3/16 (水)	常食 全粥	菓子パン ジュース	スパゲッティ ぶどう3粒	ごはん 牛丼・京菜	◎職員分も正式に食事提供開始
	流動 三分 五分	粥+たいみそ ヤクルト	粥+ねり梅 豆腐と玉子の出逢い	粥 牛丼・京菜	
	職員	菓子パン	スパゲッティ さとうのごはん +カレーなど	さとうのごはん 牛丼	
3/17 (木)	常食 全粥	毎日果実 バナナ1本 青りんごゼリー	天ぷらうどん 付) 青菜・ねぎ	ごはん 焼肉 付) 南瓜・トマト	◎昼のみ食器使用(うどん用 ディスプレイがないので) 配膳車・下膳車使用 
	流動 三分 五分	粥+梅干し バナナ1本 青りんごゼリー	粥+のり佃煮 スクランブルエッグ	粥 はまち塩焼 付) 南瓜・トマト	
	職員	カロリーメイト バナナ	おにぎり1個(梅) ゆで卵	おにぎり1個(塩) はまち塩焼き 青菜おひたし	
3/18 (金)	常食 全粥	カロリーメイト ジュース	ごはん ハンバーグ つぼみ菜のおひたし いちご	味付けご飯 たまご焼き アスパラソテー	
	流動 三分 五分	粥+たいみそ ヨーグルト又 ヤクルト	粥 ハンバーグ つぼみ菜のおひたし いちご	粥+つけもの たまご焼き アスパラソテー	
	職員	ビスケット(非常用)	おにぎり(おかが) 漬物(べったら)	味付けごはん (おにぎりにする)	

		朝	昼	夕	備 考
3/19 (土)	常食 全粥	菓子パン バナナ1本	ごはん メンチカツ 和風サラダ	ごはん いかと大根の煮物 漬物（味なす） キウイ	
	流動 三分 五分	粥+たいみそ バナナ1本	粥 メンチカツ 和風サラダ	粥 焼魚ほぐしと 大根の煮物	
	職員	カロリーメイト オレンジ	おにぎり（塩） メンチカツ 和風サラダ	おにぎり（梅） いかと大根の 煮物	
3/20 (日)	常食 全粥	菓子パン ゼリー	ごはん 豆腐と玉子の出逢い おひたし でこぼん（半分）	ごはん 大根と厚揚げの煮物 漬物（相馬胡瓜）	
	流動 三分 五分	粥+梅干し ゼリー	粥 豆腐と玉子の出逢い おひたし でこぼん（半分）	粥 大根と厚揚げの煮物 漬物（相馬胡瓜）	
	職員	菓子パン	ごはん 豆腐と玉子の出逢い おひたし でこぼん（1/4）	ごはん	
3/21 (月)	常食 全粥	菓子パン バナナ	ごはん チキンボール3個 春雨の和えもの	二色丼 白菜おひたし	
	流動 三分 五分	粥+ごま昆布 バナナ	粥 チキンボール3個 春雨の和えもの	粥 カニそぼろ・いり卵 白菜おひたし	
	職員	カンパン はっさく	おにぎり チキンボール	カニチャーハン （手作り）	
3/22 (火)	常食 全粥	菓子パン みかん	ごはん 八宝菜	ごはん 牛肉のしぐれ煮 ポテトサラダ	
	流動 三分 五分	粥+のり佃煮 みかん	粥 八宝菜	粥 牛肉のしぐれ煮 ポテトサラダ	
	職員	カンパン はっさく	おにぎり（梅）	おにぎり 漬物 ポテトサラダ	