Measures Against Coronavirus Disease 2019(COVID-19) at Ashikaga Red Cross Hospital

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In December 2019, an outbreak of coronavirus disease 2019(COVID-19) occurred in Wuhan, China. At that time, it was thought that Japan did not seem to suffer much damage, but over time, the infection spread rapidly throughout the world, and has a major impact on Japan. Cluster infections of healthcare workers occurred in medical institutions in urban areas, and as you all know, hospitals were forced to stop medical treatment. Under these circumstances, how to prevent infection of hospital staff and patients and maintain medical care is an urgent issue at present. The Ashikaga Red Cross Hospital (ARCH) is a COVID-19 patient accommodation facility. Currently, no staff nor hospital infections have occurred. I am reporting measures against COVID-19 infection in ARCH.

All Private rooms and Hand hygiene

ARCH moved to a new hospital site in July 2011 after the Great East Japan Earthquake. The new hospital has a seismically isolated structure, and all general wards have all private rooms (449 private rooms) and 10 negative and positive pressure switching rooms. Electronic medical record and infection control system (ICT web) were adopted at the same time. Now we can check the infection status while we are in the infection control room. A system that cannot be entered in each ward without a card key maintains high security.

Although it was constructed as a hospital that is resistant to infection, the number of MRSA detected increased after the start of medical treatment compared to before the relocation. The cause is that the preparation of hand sanitizer was delayed. I hurriedly set a hand sanitizer and personal protective equipment (PPE) in front of the hospital room, and the number of detections decreased dramatically. The tuberculosis bed in the East 9th floor ward closed in 2019. As a result, it became a model bed including the negative pressure chamber, and patients without tuberculosis could be hospitalized. Since it can be isolated, currently it is dedicated to corona-positive patients.
Geographical favorable conditions

ARCH is located along the Watarase River in the southwestern part of Tochigi Prefecture, and public transportation is not as good as in central Tokyo. Most of the staff members commute by car, and only 11 out of the approximately 1,200 staff members commute by train.

Obtained JCI certification & WHO: Five timings for hand hygiene

In February 2015 when the hardware was in place, we were certified by the Joint Commission International (JCI), which aims to improve patient safety and quality of care. ARCH has become the ninth JCI certified hospital in Japan. JCI screening is open to everyone in the hospital, and there are no exceptions. Infection control requires complete hand hygiene in line with evidence-based guidelines. "WHO Hand Hygiene Five Timings" are followings:

1. Before touching the patient.
2. Before clean /sterile operation.
3. After the risk of exposure to body fluids.
4. After touching the patient.
5. After touching surrounding the patient.

ARCH selected and aimed to improve the compliance rate. Environmental studies have found that high frequent contact surfaces such as PC keyboards, mice, doorknobs and curtains are polluted. The nurse puts hand sanitizer in the pochette (small cosmetic bag) and disinfects the hands at 5 timings. ARCH has instructed doctors to always use hand hygiene before and after entering the room, and ARCH has recommended cross-monitoring.

Infection Control Meeting for COVID-19: Information sharing

As like as the annual influenza measures, signboards were set up in the hospital to alert people to the outbreak of COVID-19. On January 31st (Friday), a countermeasures meeting was held with representatives from each department. Then, we examined how to treat patients with suspected COVID-19.

At this time, 7793 people were infected in 17 countries around the world, 170 people died, and Japan Government certified COVID-19 as a designated infectious disease. Respiratory symptoms and exposure history were screened to identify diseases other than COVID-19, and if all differential diagnostic results were negative, COVID-19 was suspected,
and all suspected patients were examined at an emergency center. I decided to have a medical examination in the room. From January 31st, we had meetings every Monday from 9:30, and we held extra meetings as needed. At the direction of the director, all meetings and banquets that would cause clusters were banned. Before the meeting was held, windows and doors were opened to ventilate, and the meeting was generally done within 30 minutes. The COVID-19 Countermeasures Meeting was held 20 times by May 2.

**Staff cafeteria, Parlor, Changing room, General medical office**

We searched for places that cause infections with a high risk of clustering in the hospital. That situation called "three C’s" (closed spaces, crowded places, close contact). At the staff cafeteria, it was common to take off the masks, line up shoulders or face each other while having a chat and eating. It was a very close place, the riskiest place and situation.

Therefore, we reduced the number of chairs to about one-third, stopped facing each other, and forbid the use of center part of three-seat and two-seat chairs for one person, and made a reservation for a small number of people. The windows and doors of the cafeteria were open, and conversation during meals was prohibited. In the parlor as well, I tried to avoid "three C’s Situation". The blind spot was the staff changing room. The lockers are lined up closely, and it will be a close contact without a mask. ARCH provided the masks to the staff, and the staff took the masks with them the day before and required them to wear masks before entering the facility the next day.

Perhaps because of the low awareness of infection among doctors, there were quite a few who did not wear a mask. The doctors in some group had a case conference in front of the electronic medical record in the general medical office, and it was a situation of "three C’s". Not only in the medical office but also in other places, all windows and doors were opened during business hours to provide ventilation.

Every Friday, we distributed the mask for the next week to the doctor's mailbox to encourage them to wear it. Due to the limited supply of masks, we have set a mask distribution system of 1 mask per day for all departments. ARCH ordered everyone in the hospital to wear a mask, but it was difficult at first. People who don't wear masks are warned to use them, now everyone wears them.

**Cruise ship “Diamond Princess”**

At the request of the Japanese Red Cross Society, a medical team led by me was formed and rescued the cruise ship Diamond Princess from February 14th to 16th. After the
boarding procedure, I was informed by the previous team. Our mission is to provide medical support for medical facilities on board. It is to provide emergency care for patients, excluding COVID-19, who do not have fever. This allows the medical center staff to rest at night.

The reality was different. The first patient was a 68-year-old woman who had a complaint of respiratory distress and a temperature of 36.8 degrees. I was worried about the breathing rate of 24 breaths / minute, and when I took a portable X-ray photograph, the bilateral inferior lung fields definitely showed pneumonia with frosted glass shadows. There is a COVID-19 patient who has no fever. This made me nervous. COVID-19 is prevalent in the ship, and 33 patients were treated with Full PPE, and 5 patients were suspected of having COVID-19 and were disembarked after PCR.

On the ship, the number of patients increased rapidly, and even the staff's break room was used for medical treatment, and it was like a battlefield. As a result, I had to take a nap on the sofa in the doctor's office, which kept me nervous and I could hardly sleep. Always I wear a mask when I am not eating and try to keep my hands clean. After completing the mission then disembarking, I stayed at home for 14 days for health observation. In the morning and evening, I checked my body temperature and checked my health condition. I always wore a mask and stayed in a house.

**BCP measures (business continuity plan)**

Many medical facilities are suspended from outpatient treatment, emergency services, and surgery due to infection of staff, and this would lead to medical collapse. On March 2nd, the Japanese Society for Infection Prevention and Control issued a guideline for the second version of the Coronavirus infectious disease in medical institutions. On March 10th, the second edition was revised on 10th

According to the guideline, even if you wear a mask or N95 mask and make a heavy contact with the patient who is wearing the mask, the exposure risk is low. Heavy contact is defined as being together within about 2 meters for a few minutes or more. No employment restrictions are required for asymptomatic health workers. It means that if all the staff in the hospital properly put on and take off the masks, even if a COVID-19 positive person comes out, there will be no work restrictions. ARCH did the following:

- Mandatory hand hygiene and proper mask use.
- Avoid high and medium risk acts as much as possible.
- Suspension of staff with fever.
- Do not make a cluster.
- Create an environment where you do not miss any risks.
For health management, all employees measure body temperature every day and record it on the thermometry table in each department.

**No visits and Separation of traffic lines**

All visits to inpatients were prohibited, and family members who delivered inpatient clothes were given an interview card and handed them in front of the nurse station. In the hospital, the flow of patients and staff was completely separated, and the entrance was regulated. The front entrance and after-hours entrance were exclusively for outpatients. Persons whose body temperature was measured above 37.5°C and who did not wear a mask were prohibited from admission. The staff passed through the dedicated doorway and separated the traffic lines. COVID-19 patients are to be transported directly from the backyard to the former tuberculosis bed in the East 9th Ward.

**COVID-19 Patient Manual**

As of February 28, the Infection Control Office created a COVID-19 compliant manual and distributed it to each department. It has been revised according to the ever-changing situation, and the 8th edition was released on April 21st. The contents are divided into general and individual explanations and explained in detail.

**Examination of COVID-19 suspected patient, PCR test**

COVID-19 suspected patients are examined in the isolation examination room of the emergency center. The patients (including attendants) wear a surgical mask, and the doctors consult patients after wearing personal protective equipment in a separate room. The PCR test of patients with suspected COVID-19 is performed by a drive-through method for people with mild illness from 13:00 to 14:00 on weekdays.

The staff consists of a doctor who collects samples, a nurse who assists, a medical department for administrative procedures, and a general affairs department for patient guidance. A staff member who failed to properly attach and detach PPE at another hospital became infected with COVID-19. So we made a PPF procedure video including hand hygiene, exhibited it at conferences, and conducted a total of 12 slipping on-off trainings at ARCH.

**Acceptance of COVID-19 positive patients**

The first inpatient who is a self-employed person in the nearby Sano city was a dialysis patient living in Tokyo. He was staying at the hotel on weekends while receiving dialysis at a clinic in Oyama City, but as he was found to be positive for COVID-19, he suddenly left the hotel and waited in his office.
At the request of the prefectural office, he was admitted to the former tuberculosis ward and started dialysis. The condition was stable until the 4th day after hospitalization, but the respiratory condition deteriorated in dawn and oxygen administration was started. Since the condition worsened, I intubated an endotracheal tube and put on a respirator.

The patient was a heavy smoker who smokes 100 cigarettes a day before starting dialysis treatment. So he was eligible for ECMO because of high risk cases. Since ECMO treatment is not being carried out at ARCH, we contacted Saiseikai Utsunomiya Hospital and asked Dr. Ogura, the director of the Emergency and Emergency Center, to transfer for treatment. The patient was transported in a doctor's car which is a specially equipped ambulance for an emergency patient, ECMO started on the same day, and he was withdrawn on the 25th day. Other COVID-19 patients admitted to our hospital are only mild patients and are discharged from the hospital.

**Equipment maintenance**

As all employees wear masks, the amount of masks used increases, stocks run out, and hand sanitizers tend to run short. The Administration Department has been working hard to secure masks and hand hygiene products since the outbreak of COVID-19.

**Conclusion**

The virus does not choose people. We are striving for "hand hygiene" and "correct wearing and removing of masks" throughout the hospital. In addition, we are striving to create an environment that eliminates the situation "three C’s: closed spaces, crowded places, close contact" and reduces the risk of infection to zero.