Remote Death Certification Using Telemedicine in Japan

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Abstract:
A 92-year-old woman diagnosed with dementia and end-stage gastric cancer received end-of-life care on the island where she lived. Informed consent concerning remote death certification based on the Japanese government’s guidelines was obtained from a family member in case a physician was unavailable. A physical examination after cardiopulmonary arrest was conducted, supported by telemedicine and a well-trained registered nurse under remote supervision of the physician who last saw the deceased directly. Death certification was provided accordingly. To our knowledge, this was the first case of remote death certification using telemedicine in Japan.

Key words: death certification, remote, rural, telemedicine

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Introduction

Death occurs for every individual. In most developed countries, death is typically certified by medical doctors. However, there have been difficult situations in remote areas where medical doctors happen to be absent at the time of death. One of the tools used to solve this issue is telemedicine. The Ministry of Health, Labour and Welfare recently provided a guideline on the usage of telemedicine when issuing death certificates (1).

We herein report a case in which we used telemedicine to certify a death that occurred on a remote island. According to the response from the Ministry of Health, Labor and Welfare, this was the first case of remote death certification to be reported in Japan and, to our knowledge, such reports remain rare worldwide.

Case Presentation

We conducted remote death certification for an individual who passed away on Ajishima Island. Ajishima is a remote island located a one-hour ferry ride off the coast of Ishinomaki City, northeast of Japan (Figure). Like other rural areas throughout Japan, there has been a dramatic decrease in the population in Ajishima, with the maximum population of approximately 3,000 residents in the 1960s dropping to just 300 in 2018 (2).

There is only one clinic on the island, which was privately established with a nursing facility. Physicians visit the clinic from larger inner cities during the day on weekdays and stay over weekends. There is thus a period of time on weekdays when physicians are absent. This situation has occasionally required families to wait until the next day for physicians to arrive and examine the deceased, an event that sometimes must be postponed even further due to the ferry being cancelled because of bad weather. However, several nurses live on the island, enabling them to respond immediately to patients’ emergency situations under physicians’ directions.

A 92-year-old woman with a 16-year history of dementia, hypertension, diabetes, and lumbar spondylisis was admitted to the nursing facility 4 years ago because of a weakened activity of daily life (ADL). End-of-life decisions were not made during this admission. Her ADL did not improve even with the introduction of a wheelchair, which made it difficult to discharge her home. One month before death, she experienced shortness of breath, which was diagnosed as exacerbation of chronic heart failure and treated with diuretics. Four days later, she began to complain of upper abdominal
pain accompanied by vomiting but no fever.

A physical examination revealed a mass with tenderness in the epigastrium. Computed tomography showed a thickened wall of the gastric body, suggesting a diagnosis of gastric cancer with suspicion of gastric stenosis. Given her impaired cognitive function, advance-care planning was performed with her son as a surrogate and a physician, arriving at the shared decision that the patient herself would wish to spend her remaining time on the island and receive end-of-life care with a Do-Not-Resuscitate order. Fluids were subsequently administered on occasion but were stopped after she fell unconscious three weeks later. A physician examined the patient, predicting that she would pass away within a few days. At this point, it was anticipated that physicians might be absent at the time of the patient’s death. Therefore, informed consent was obtained based on the government’s guideline for the conduct of remote death certification.

One day later, at 3:00 am, the patient went into cardiopulmonary arrest, which was reported by a registered nurse to the physician over the phone. Because strong winds and high waves were anticipated that day, it was announced the day before that the ferry boat would be cancelled all day, which made it difficult to certify death within 12 h. Therefore, both the physician and registered nurse took the steps to start remote death certification using a video-call between tablets connected by a 4 G cell network.

As this information and communication technology (ICT) had been established beforehand, clear images were able to be obtained without issue. First, the nurse explained to the physician that there were no signs of palpitation, breath, or a pupillary light reflex. The nurse then showed the physician the monitor, showing an asystole state. These steps were conducted twice at five-minute intervals. Second, the body of the deceased was examined from head to toe to confirm the presence of postmortem lividity and, simultaneously, no signs of neck compression, petechiae in the palpebral conjunctiva, or any trauma to the head or body, thus convincing the physician that the death could be attributed to no other cause except the already-known cancer. Photographs of the body were also taken and stored as medical records to be examined retrospectively from different angles or via visualizations collected by cameras instead of ICT devices.

Based on these findings, the death certificate was filled out by the nurse under the physician’s direction. Finally, the certificate was handed to the family member after holding an interview with the physician concerning the cause of death, which was also conducted remotely using ICT.

All of the above processes were described on official documents and submitted to the Ministry of Health, Labour and Welfare as well as Ishinomaki City under the consent of the patient’s family.

**Discussion**

We performed death certification via telemedicine assisted by a registered nurse practitioner. According to the response from the Ministry of Health, Labor and Welfare, this was the first case of remote death certification to be reported in Japan. To our knowledge, such cases are also rare elsewhere in the world.

Death certification procedures vary among regions. The US standard guideline indicates that medical certification must be completed within 48 h by “the appropriate physician, physician assistant, or nurse practitioner” (3). In Oregon, when these healthcare providers are absent, their associate, the chief medical officer of the institution where death occurred, or the physician who performed an autopsy of the deceased are additionally allowed to provide death certifi-
cates, provided the person is given access to the medical history of the patient and death is deemed to be due to natural causes (4). In Australia, if a deceased patient’s general practitioner (GP) is absent, another GP can complete the death certificate if they have sufficient information and are “comfortably satisfied” (5).

In Japan, since 1947, death certificates have been issued only by the deceased patient’s treating medical doctor after being submitted to the mayor of the municipality for burial or cremation (6). When issuing a death certificate, it is required that the medical doctor examine the body of the deceased (7). When a medical doctor is absent at the time of death, they are permitted to examine the body of the deceased after death in order to certify that the death was caused by a known disease (8).

However, there have been situations in rural areas where the treating medical doctor is far away at the time of death, making it difficult to examine the deceased promptly (1). Such circumstances lead to a delay in the issuance of a death certificate accompanied by delayed cremation (1). These issues have forced patients to suffer a number of difficulties, such as being forced to move away from the place where they have lived for a long time, having to be admitted to medical facilities before death, and their bodies being left alone for a long time or being transported a long distance after death (1). From the perspective of advance-care planning, the elimination of such difficulties is desired (9).

One tool developed to resolve these issues is telemedicine. The Japanese government recently provided guidelines regarding the usage of telemedicine when performing death certification to ensure that medical doctors can explain the patient’s cause of death to family members (1). According to this guideline, all of the following issues must be met: a) the patient’s death is predicted to occur within 14 days due to the disease diagnosed at the latest face-to-face examination by the medical doctor, b) orders about treatment at the end-of-life stage are shared in advance among patients, their family members, nurse practitioners, and medical doctors after receiving a medical explanation from a medical doctor, c) it would take more than 12 h for a medical doctor to directly examine the body of the deceased, d) nurse practitioners who have completed a series of lectures and hands-on training in forensics can provide medical doctors the information required for death certification, and e) medical doctors provided both a report from such nurses and information through ICT devices can certify that death occurred due to no other abnormal reason than the already-known disease.

Ajishima Island is an area of Japan that has suffered from a shortage of medical and long-term care. The aging rate was more than 70% as of 2017 (10). Such limited resources may be one reason residents decide to move away from the island when they develop senility. Indeed, a previous study showed that approximately 40% of respondents intended to make such decisions (10). However, the presence of a long-term-care health facility next to the clinic has made it possible for some elderly residents to receive end-of-life care on the island. The only issue was the presence of physicians at the time of death. Our experience with the present patient may help allow other residents to spend their remaining time on the island as they wish. Similar situations may also be seen in other rural or remote areas around the world, and these techniques may prove useful during a pandemic, such as the COVID-19 pandemic (11).

However, there are several issues associated with this procedure that must be considered. First, we carefully reviewed our patient, looking for any possibility of an accident or homicide while using ICT to prepare a death certificate, as directed by the Japanese Society of Legal Medicine (12). We acknowledge that we cannot completely avoid accidents or homicides themselves. However, in the present case, since the family had stayed in the same room with the patient day and night, we considered it difficult for homicide to have been performed or an accident to have been missed. Furthermore, fluids administration was discontinued before death, which made it difficult to inject any life-threatening drugs, such as muscle relaxants. Since a remote camera was installed in the patient’s room to allow her condition to be monitored from the nurse station, an immediate response would have been mounted should any of the family have attempted homicide. Therefore, we are convinced that homicide did not occur in this case, although we admit that the conditions in other cases will not always be identical to those in the present case. We must bear in mind that issues with the possibility of homicide are not particular to remote death certification and also exist in hospitals and home care settings. Under the basics of death certification, physicians should proactively search for traces of neck compression, petechiae in the palpebral conjunctiva, or unnatural trauma. The color of the postmortem lividity should also be taken into consideration; dark violet lividity appears in natural death while other colors suggest unnatural death. In the present case, we demonstrated that these findings could be obtained sufficiently through both images and with the assistance of a well-trained registered nurse. The further observation of photographs of the deceased would also be useful for detecting any signs of trauma. Still, it would be difficult to detect homicide achieved using intravenous drugs. If any signs are noted that cannot be explained by natural death, such as injection scars, physicians should not hesitate to cease the remote death certification and request an autopsy for further consultation by a forensic pathologist.

Second, the main concern associated with using ICT as a remote death certification may be whether or not it can provide as much information as a direct one. In the present case, the widely used app, FaceTime, provided quantitative images for us to confirm the lack of any signs of neck compression, as such an observation is required in the official checklist for remote death certification. It also effectively reproduced the color of postmortem lividity, allowing confirmation as such, which was another required item in the checklist. Second, to avoid a situation wherein the nurse could not transfer adequate images (both intentionally and
unintentionally) at the time of the death diagnosis, we repeatedly conducted simulations in advance. This allowed us to complete all diagnostic procedures without issue. As a result, we found the quality of ICT to be adequate for remote death certification. We also strongly recommend that future attempts be preceded by thorough preparation, based on our experiences.

Third, it takes considerable time and cost for registered nurses to complete the requisite training courses for remote death certification. The actual curriculum consists of a six-hour e-learning lecture and a four-hour practical lecture, held in just two places in the country. This may be one of the reasons why there have been no reports of death certification since the first establishment of such guidelines in 2018. To expand utilization, online courses for practical skills will need to be established in the future. However, a careful discussion will need to be held concerning how to maintain the quality of these lectures, as forensic medicine is not included in nurses’ education programs (12).

Finally, residents’ understanding and agreement in advance concerning the usage of telemedicine is essential. Considering the difficulty of securing medical doctors in rural areas, telemedicine has substantial potential to compensate for the medical supply shortage. Fortunately, awareness of telemedicine has risen during the outbreak of COVID-19. However, a sufficient explanation on telemedicine by the municipalities or medical institutes will still be necessary. Such efforts would help allow residents to spend their final days where they have long lived.

Overall, remote death certification was remarkably useful in our case. We believe that this process will become an important alternative to a direct examination by medical doctors in the next few decades. Further reports from other areas are expected to improve awareness among health professionals as well as residents.

Conclusion

Remote death certification using telemedicine can be an important tool when medical doctors are absent, especially in rural areas. Improvements in knowledge and skills in performing death certification with the usage of telemedicine are required for both medical doctors and nurse practitioners. Health professionals should inform remote-living residents about remote death certification in advance to ensure a thorough understanding of their options and allow them to spend the end of their lives in the location they desire.

The authors state that they have no Conflict of Interest (COI).

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