Case Report

Breaking Down Barriers: Easter Island's First Telestroke Thrombolysis Experience and Case Report

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Easter Island (Rapa Nui), Chile, is remote, located in the Polynesian Triangle in Oceania. The closest continental point is Chile, 3,512 km east. It has a population of 7,750 inhabitants, who are Chilean citizens, and receives more than 60,000 tourists a year. For this entire population, there is a medium complexity hospital without a neurology specialist. In 2019, local professionals were trained in a Telestroke program with remote clinical support conducted by neurologists located on mainland Chile. We present a 50-year-old native male, with unknown medical history, who suddenly presented right-half-body weakness and aphasia. He was evaluated via Telestroke consultation, and thrombolysis with tenecteplase was indicated. The patient improved rapidly and 45 min later the NIHSS score was 0 points. To our knowledge, this is the first reported case of Telestroke treatment in such a remote area, highlighting the importance of telemedicine to overcome geographical and technological stroke care barriers and to improve patients' outcome, no matter where they live.

Key Words: Telestroke—Acute stroke—Thrombolysis—Stroke care—Telemedicine

Introduction

Easter island (Rapa Nui), Chile, is one of the most remote inhabited islands in the world, located at the southeasternmost point of the Polynesian Triangle in Oceania (Fig. 1). The nearest continental point lies in Chile, 3,512 km away. The 2017 Chilean census registered 7,750 residents of the island, all Chilean citizens.[1] In addition, it receives more than 60,000 international tourists per year.[2] For this entire population, there is one hospital (Hanga Roa Hospital) with 16 beds and basic medical specialties. Given the distances from the island to Chile, there are disparities in access to consultations with specialists in neurology and the access to reperfusion therapies for acute ischemic stroke.

One of the main challenges of reperfusion therapies for ischemic stroke is that they can only be administered within a defined period of time, and the effect of treatment is also time-dependent.[3,4] Telemedicine has been proposed as cost-effective method to increase access to expertise, especially for geographically remote areas.[5] Thus, in 2019, Hanga Roa professionals were trained in a Telestroke program with remote clinical support carried

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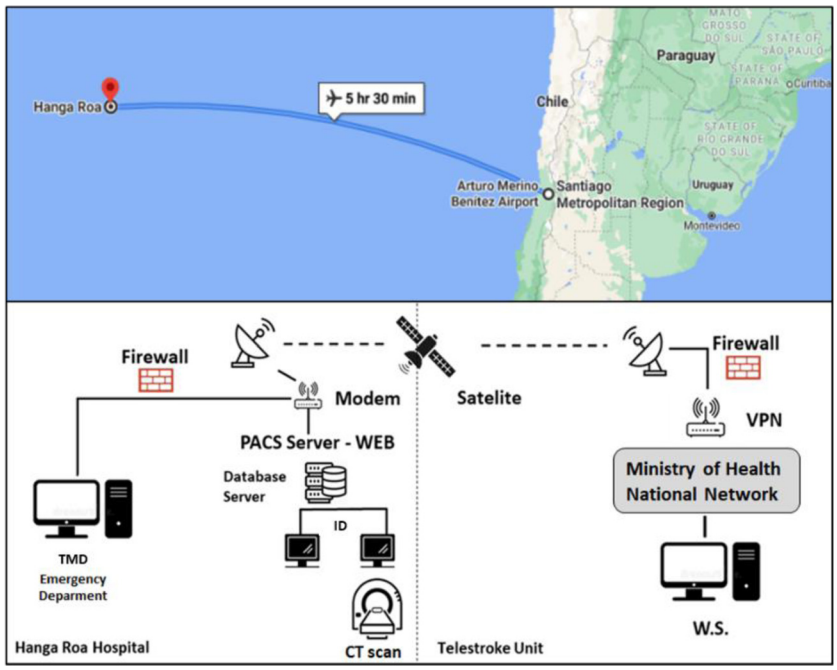

Fig. 1. *Telecommunications system for telestroke assistance with Hanga Roa. Legend: ID: imaging device; TMD: Telemedicine mobile device; PACS: Picture Archiving and Communication System; VPN: virtual private network; WS: work Station.*

out by neurovascular specialists located in Santiago, the capital of Chile. The telecommunication system functions via satellite and Intranet connections (Fig. 1).

This case report comments on the first stroke treated on the island via telestroke and the subsequent experience, discussing the relevancy of Telestroke for such remote areas. This case report was prepared following the CARE Guidelines.[6]

Case report

A 50-year-old native fisherman who speaks Spanish, with unknown medical history, suddenly presented right-half-body weakness and aphasia. He arrived at the Hanga Roa Hospital within 14 min of symptoms onset. The emergency-room physician conducted an initial physical examination (Blood-Pressure: 115/79 mmHg, glycemia: 104 mg/dl, estimated weight 60 kg). The non-contrast brain computed tomography (CT) was normal (ASPECTS 10).[7] The local physician initiated Telestroke consultation 45 min following arrival at the hospital. A video-audio link was established over the satellite connection, and a virtual face-to-face consultation was performed by the vascular neurologist in Santiago. The National Institutes of Health Stroke Scale examination score (NIHSS) calculated was 9 points (aphasia and right hemiparesis).[8] There were no contraindications for thrombolysis, so tenecteplase 0.25 mg/kg was initiated at 84 min from the time of symptoms onset. Quality outcomes are shown in Fig. 2. The patient quickly improved, and 45 min later the NIHSS score was 0 points. No treatment complications were detected. The performed etiology clinical assessments diagnosed an atrial fibrillation, and oral anticoagulation was initiated at discharge. Post-thrombolysis care was performed according to national and international guidelines.[5]

Follow up visit at 3 and 12 months showed no residual symptoms or disability (modified Rankin Score of 0)[9]. The

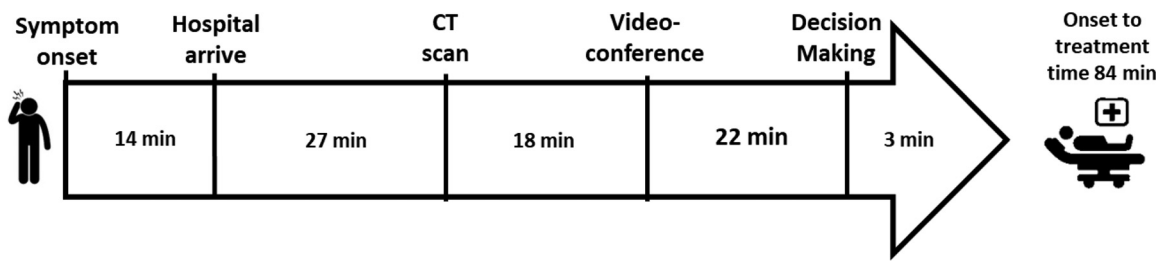

Fig. 2. *Timeline, indicating time from symptom onset to intravenous thrombolysis.*

patient gave his informed consent for the publication of this case.

Discussion

The present case demonstrates that thrombolytic therapies can be administered safely in general hospitals, particularly those in isolated regions, via teleconsultation by experienced stroke neurologists. And as a result, Telestroke has become an essential element of many stroke care systems. The most common telestroke configuration is a "hub-and-spoke" model, wherein a central "hub" organization provides remote audio-visual access to a stroke specialist for decision support in a given number of peripheral hospitals.[10] While several other programs have been developed with similar goals and objectives, these programs differ in the distances from the hub and the populations they serve.[11] The system in Hanga Roa includes a satellite connection and VPN access to the national Chilean Ministry of Health network. This connection also provides access to the local PACS server, for CT images and viewing of patient data (Fig. 1). At present, this same Telestroke system links Hanga Roa Hospital and nine other "spoke" hospitals located in continental Chile to the virtual hub located in the capital, Santiago.[12]

As described in this case, patients who are admitted to the hospital with a possible indication for systemic thrombolysis are immediately examined by physicians. The neurologist at the hub, who is available 24/7, is contacted and informed of conditions. Following the completion of the CT scan, the stroke consultant responds using video conference software (Polycom™) with broadband Internet access (currently with an average speed of 100 Mbp/s). The examination focuses on the NIHSS. After checking for possible exclusion criteria, the neurologist determine whether the patient is eligible for thrombolysis. Treatment initiation time in this case was 70 min, which is not the optimal time (door-to-needle time less than 60 min) according to the suggested standards.[5,13,14] However, this time lag may be explained by the fact that this was the first thrombolysis on the island and also because their CT scan is usually not running all the time and had to be connected. These issues can be rectified and would make the process more efficient.

Hanga Roa's telestroke program began in 2019 with an intensive education plan conducted at the local hospital. The program included training regarding NIHSS, implementation of a decision-making algorithm, and disposition protocols for thrombolytics. From May 2019 to December 2021, there were 88 teleconsultations. Of those, 30 were Telestroke code activations and 5 were thrombolysed. At 90 days, the median modified Rankin Scale was 2 (IQR 0-5). The only thrombolytic available in the island was tenecteplase, used as an alternative to alteplase [8]. The case discussed here represents the first treatment performed on the island, and it is important to recognize that transferring a patient from Hanga Roa to a comprehensive hospital on the mainland for thrombectomy is not always possible, due to distance and the lack of frequent and continuous transport to Chile.

To our knowledge, this is the first reported case of telemedicine for stroke treatment in such a remote area. The implementation of the program has been very important for generating equity in health care and giving the island's Chilean citizens access to effective treatment in an isolated area with an obvious geographic gap. This report highlights the potential for breaking down geographic obstacles in distant communities, especially for the benefits of using Telestroke for patients suffering a stroke.

Disclaimers

None.

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