Satellite Telechemotherapy as a Model to Overcome Geographic Access Barriers to Cancer Care in Peru

50

Tatiana Vidaurre, Guillermo Valencia, Patricia Rioja, Andrea Meza, Jule Vásquez, Luis Mas, Claudio Flores, Jeannie Navarro, and Stéphane Bertani

Key Points

- The geographical remoteness of Amazonian Indigenous communities in Peru limits their access to cancer care.
- Satellite telechemotherapy helps overcome geographic barriers to cancer care in remote regions.
- A telechemotherapy center was successfully implemented in the Amazonian city of Lamas, home to the Kichwa-Lamista people.
- Satellite telechemotherapy can provide significant cost savings and demonstrable improvements in the quality of life in Amazonian Indigenous communities.

Cancer is the second most common cause of death worldwide and was responsible for approximately one in six deaths (nearly ten million) in 2020. Approximately 70% of cancer deaths occur in low- and middle-income countries, and less than 30% of these countries have treatment services for cancer patients comparable to those of high-income countries [1]. According to Globocan 2020, cancer was the leading cause of death in Peru (14.8%) [2], with an estimated 34,976 incidences. The most frequent cancers were prostate (12.5%), breast (9.8%), stomach (9%), colorectal (6.6%), and cervical (6.1%) [3].

Peru's national cancer plan (Plan Esperanza) was launched by the Instituto Nacional de Enfermedades Neoplásicas (INEN) in 2012. Multiple strategies were identified and implemented, including (but not limited to) decentralization, the development of institutional clinical practice guidelines, access to new oncological drugs, and awareness campaigns [4]. However, one of the most significant barriers to accessing cancer care in Peru is its complex geography. Nearly 50% of patients have to travel long and even dangerous distances to receive adequate cancer care mainly in the capital, Lima (at INEN), with expensive out-of-pocket costs [5]. Moreover, 75% of the cases referred to Lima are in advanced stages, which require systemic treatment (mainly chemotherapy) [6]. This barrier is common in remote regions, especially in Amazonian Indigenous communities, where few services for optimal cancer management exist. However, telemedicine has been demonstrated to play an important role in medical care worldwide, being widely used in the COVID-19 pandemic, even in countries with limited internet access [7]. In this context, the present study concerns a "distance-telemedicine-enabled" strategy that has been enacted by medical oncologists through an outpatient telechemotherapy module in a Peruvian jungle hospital (Lamas Hospital, San Martín) [8].

Methods

A Satellite Telechemotherapy Centre was implemented in Lamas Hospital, Lamas, San Martín department (region) (1100 km from Lima) for II-E (second-level) care from November 2015 to March 2018 as a remote oncology service located in the Peruvian jungle with a considerable Indigenous population. Its implementation and efficacy analysis were conducted in three main stages:

1. Organization—health professionals were trained, and a central chemotherapy room was developed.
2. Definition of inclusion criteria and application of systemic treatment—the inclusion criteria were as follows: patients >18 years from the San Martín region with a histopathological diagnosis of cancer, performance status (ECOG) <3, in need of systemic chemotherapy, and first cycle of chemotherapy received in Lima (INEN) without serious adverse events. The exclusion criteria were the presence of an uncontrolled comorbid disease, contraindication of chemotherapy, pregnancy, and participation in an ongoing clinical trial.
3. Analysis and monitoring—efficacy, patient adherence to systemic treatment, adverse events, patient quality of life (QoL), and costs were evaluated.

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Organization of Implementation

A working team was trained at INEN and included one medical officer, three medical oncologists, three nurses, and one pharmacist. A central chemotherapy module with 18 chairs for infusions, a hospitalization room, one medical office, one nursing station, and one administrative office room was established (Fig. 50.1). Consultations on complex cases or for therapeutic decisions were conducted in INEN (Lima) via satellital telemedicine.

Patients and Application of Systemic Treatment

Patient selection was initially performed exclusively at INEN with adherence to the inclusion and exclusion criteria above. A total of 121 patients were considered, and 56 were enrolled in the program. Patients received systemic treatment according to INEN policies and protocols. Chemotherapy was initiated at INEN and continued in Lamas. The procedures were supervised by medical oncologists from INEN and were reg-

Fig. 50.1 The chemotherapy module at Lamas Hospital, Lamas, San Martín, Peru. (Photos: INEN hospital collection (top), Andrea Meza (bottom))

istered in both centers. The medical team at Lamas and INEN held medical evaluation meetings before each cycle of treatment.

First-Step Analysis

An estimated 300 new cancer cases are reported in San Martín annually. INEN receives referrals from all centers under comprehensive health insurance in Peru (SIS—a system of free or low-cost health insurance) across the country. Nearly 80 patients from San Martín were being initiated chemotherapy at INEN each year. Procedures were recorded in medical records at Lamas hospital and INEN. Epidemiological data, oncological diagnosis, types of chemotherapy and/or hormonal therapy, number of chemotherapy sessions, and description of adverse events (graded according to CTCAE version 4.0) were included. A cost survey was used to evaluate patient travel from home to Lima or Lamas, including transportation, food, and accommodation costs. Quality of Life (QoL) was assessed using a questionnaire (EORTC QLQ-C30 version 3) validated in Spanish [7], which evaluates patient perception of global health, functional status in different spheres, and symptoms related to the disease.

Implementation Results

A total of 56 patients were included for telechemotherapy; the median age was 56 (19–78), and most were women (73.2%). The most frequent cancers were breast (32.1%), cervix (18.9%), and gastric (17.0%). In terms of clinical stage, the majority had metastatic disease (73.2%). Including a median follow-up 24 months from the initiation of telechemotherapy, 501 telemedicine sessions were performed. A total of 232 cycles of chemotherapy were administered (82% intravenous, 13% oral, and the remaining 5% hormone therapy). No acute complications were reported. Late hematological complications included grade 2 neutropenia (15.7%), grade 4 neutropenia (afebrile) (5.2%), grade 1 anemia (5.2%), and grade 4 thrombocytopenia (5.2%) with ecchymosis and resolved with adequate support. Nonhematological adverse events were grade 1 neuropathy (10.5%). Complete adherence was achieved (100%); neither patients nor relatives traveled to Lima, instead receiving chemotherapy close to home. QoL was improved in the third month (global health status increased from 76.67% to 83.33%), particularly in terms of social and emotional wellbeing. Symptoms tended to decrease with time (chemotherapy effect on disease control), and patients reported a decrease in economic difficulties over the three-month treatment period. Regarding costs, there was an average saving of 500 Peruvian soles (PEN) (or 153.54 USD).

Dissemination of Oncology Services in Lamas

San Martín is the fifth most Indigenously populated department (region) of Peru with approximately 24,319 Indigenous inhabitants, representing 4% of its total population. These inhabitants come from four linguistic families and are distributed in different ethnic towns in each of the department's provinces, with the exception of Mariscal Cáceres. The provinces with the largest Indigenous populations are Lamas (7624 inhabitants), San Martín (6182 inhabitants), and El Dorado (3928 inhabitants). The Lamas Chachapoyas provinces are Mariscal Cáceres, Huallaga, El Dorado, Bellavista, Picota, and San Martín. There are districts where the vast majority of the population belongs to Indigenous communities, such as the districts of Alto Saposoa (51%), Piscoyacu (65%) in the province of Huallaga, and Shapaja (99%) in the province of San Martín. Of the total ethnic peoples, the Lamas Chachapoyas (22,513 inhabitants) are the most prominent, being located exclusively in this department and representing 93% of the total Indigenous population. The second-most prominent are the Aguaruna, with a population of 1789 inhabitants, who are found in a small area between the provinces of Moyobamba and Rioja.

At the INEN, 3724 new patients from the Department of San Martín have been registered between 2015 and 2018. Of these, the location of the primary tumor is 886 cervical, 354 breast, 297 leukemia, 295 stomach, 245 nonmelanoma skin, 146 non-Hodgkin lymphoma, 136 oral cavity, 112 thyroid, and 80 prostate, among others.

Since 2018, specialists in clinical oncology have been included in the organization at the cancer center of Lamas to ensure self-sustainability and the continuity of cancer care in the region. From its inception in November 2015 to August 2023, 600 cancer patients were treated, of which 66% (399) were female, the most frequent age range (13%) was 45 to 49 years (78), and 98% had health insurance (SIS 80% (482) and EsSalud 18% (110)). In terms of patient location, 33.67% (202) of the patients came from the city of Tarapoto, followed by the cities of Lamas, Moyobamba, and Rioja (21.33%, 11.67%, and 10.0%, respectively).

The majority of patients seen received a diagnosis of breast cancer (25.5%; 153), followed by cervical cancer (12.5%; 75) and stomach cancer (10.5%; 63). In terms of staging, there was a higher percentage of clinical stage 4 (i.e., metastatic disease (39.2%)), as well as patients with locally advanced disease (i.e., in clinical stage III (27.7%)).

A lower percentage comes to the service in an early clinical stage (i.e., clinical stage I (8.5%)). For female patients, the most frequent cancer was breast (followed by cervical cancer); the most frequent age was 50–60 (31.4%), followed by 40–50 and 60–70 years. For male patients, the most frequent cancer was prostate, and the most frequent age range was 60 years and over (96.1%).

Most cancers were treated in clinical stage IV: stomach cancer was treated at clinical stage IV in 62.7% of cases, ovary in 37.5%, prostate in 81%, lymphoma in 57.9%, head and neck in 53.3%, sarcomas in 66.7%, lung in 77.8%, and pancreas in 100%. Cervical cancer was mainly treated at stage II (44.3%). Breast cancer was mainly treated at clinical stage III (i.e., as a locally advanced disease (47.7%)) and less commonly at clinical stage II (i.e., as an early disease (33.6%)). Most patients received antineoplastic treatment such as chemotherapy with cytotoxic and monoclonal antibodies.

Conclusions

Satellite telechemotherapy was successfully implemented in a Peruvian jungle cancer center. This strategy represents an effective model by which to overcome geographic access barriers to cancer care in remote regions, and it may be adapted in other rural areas lacking oncological centers and resources, providing systemic treatment with significant cost-saving benefits and demonstrable improvements in QoL.

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Gail Garvey
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