Impact of Clinical Simulation Training in Transplantation

N. Marogna*, R. Bernardi, M. Monti, G. Costa, M. Aguirre Mandau, and J.L. de Echave

Hospital de Alta Complejidad en Red “El Cruce”, Dr. Néstor C. Kirchner SAMIC, Buenos Aires, Argentina

ABSTRACT

Introduction. The Hospital El Cruce is a high complexity center that performs transplants, both the procurement and the implant of organs and tissues. To deal with the low availability of organs and tissues from cadaveric donors it has been implemented the training through clinical simulation.

Objective. To assess if continuous training through procurement clinical simulation workshops modifies the production and quality indicators of organ and tissue procurement for transplantation in the hospital.

Materials and Methods. The workshop focuses on the procurement difficulties as detailed: workshops with high fidelity simulators: detection of potential donor; certification of death; treatment and selection of potential donor; workshops with role play actors; communication of the patient’s death; and request for the last will of the deceased. A retrospective study was performed to compare between two periods the procurement activity. These periods defined 30-month before and after the opening of the workshop, as periods 1 and 2.

Results. In period 1, 44 patients underwent organ transplantation and 64 patients a tissue transplantation. After training through workshops (period 2), the number of patients increased to 71 for organ transplantation and 116 for tissue transplantation.

Conclusions. Assessment of the two periods indicates that the production and quality indicators of organ and tissue procurement improved in the second period. Continuous training through procurement clinical simulation workshops is highlighted within all tasks carried out in the hospital. Clinical simulation is a motivating factor for the development of this activity in the hospital.

THE Hospital El Cruce (HEC), located in Florencio Varela city, is a high complexity center in which transplantation is performed. Both the procurement and the implant of organs and tissues are carried out in this hospital [1]. Since its founding, it has undertaken transplantation on 808 patients: 371 patients received organs or tissues procured in the hospital and 437 patients received organs or tissues in the institution. Furthermore, in 12 cases the organ or tissue was procured and implanted in the hospital, with logistic benefits and a reduction in the cold ischemia period [2].

Transplantation is limited by the low availability of organs and tissues from cadaveric donors. In addition, identifica- tion of potential donors, inadequate contraindications, and refusal of organ donation constitute the main limitations for the organ and tissue procurement [3]. The treatment of neurocritical patients, regardless of their neurological prognosis, as well as the detection and selection of potential donors, and communication with the families, are activities exclusively carried out by health care staff [3,4].

The HEC has 198 beds in total, 73 of which are for critically ill patients and are divided as the adult intensive care unit, the pediatric intensive care unit, the critical patient care unit, and the coronary care unit. The hospital has an exclusive medical staff dedicated to organ and tissue procurement (1 transplant coordinator) that is in charge of the management of subprograms aimed at increasing the

*Address correspondence to Nerina Marogna, MD, Hospital de Alta Complejidad en Red “El Cruce”, Dr. Néstor C. Kirchner SAMIC. Avenida Calchaquí N*5401 Florencio Varela, 1888 Bue- nos Aires, Argentina. E-mail: nerinamarogna@gmail.com

https://doi.org/10.1016/j.transproceed.2017.12.041

detection of potential organ and tissue donors [2,5,6]. The transplant coordinator is also dedicated to the communication with the family in the brain death process [3,7,8] and to the training of the health care staff. Since December 2014, training through procurement clinical simulation workshops (PCSW) has been implemented, which consists of scenarios that deal with these main issues, such as identification, certification, and selection of donors, and communication with the donor's family.

OBJECTIVE

To assess if continuous training through PCSW modifies the production and quality indicators of organ and tissue procurement for transplantation in the HEC.

MATERIALS AND METHODS

Since 17 December 2014 until 31 May 2017sixtyPCSW were done. The training objectives are as follows:

- To increase the availability of transplantation;
- To integrate the organ and tissue procurement for implantation so as to make it a regular health activity; and
- To improve the quality of the organ and tissue procurement for transplantation.

The 4-hour intensive training takes place in the HEC Simulation Center consisting of small groups of doctors and nurses.

The session starts with a multiple choice test of previous knowledge that is repeated at the end of the activity. After that, a communication framework of 30 minutes is provided by the instructors. The session continues with two simultaneous workshops with simulated scenarios that last 10 minutes (with high-fidelity simulators and role play actors) and the corresponding 45-minute video-assisted debriefings, which are focused on the procurement difficulties as detailed:

- Workshops with high-fidelity simulators
  - Detection of potential donors and certification of death [1,9e12], and
  - Treatment and selection of potential donors [13].
- Workshops with role play actors
  - Comunication of the patient's death [3,7,8]; and
  - Request of last will of the deceased [3,8].

A retrospective study was performed to compare between two periods the production and quality indicators of the organ and tissue procurement for transplantation in the HEC. These periods are defined: 30 months before and after the initiation of the workshop as period 1 (from June 1, 2012, to November 30, 2014) and period 2 (from December 1, 2014, to May 31, 2017).

Information was obtained from secondary sources, a computer system for the administration and management of the organ and tissue procurement in the Argentine Republic [14], and from the hospital's digital medical records, the Coordination of Transplant and Simulation Center.

The indicators used for the assessment of the process were considered donation processes, potential brain death donors, eligible brain death donors, utilized donors, conversion rate, percentage of multiorgan donors, refusal of organ donation in brain death index, potential circulatory death donors, tissues donors, refusal of tissue donation in circulatory death index, total deaths, organ transplant patients, and tissue transplant patients [15e17].

Clinical simulation is an innovative educational strategy where knowledge and skills are gained in a more open, transversal, and inclusive way than in regular training methods. Learning from mistakes, recognized by the participant in the context of an integrative debriefing that stimulates the participation of all assistants, is a motivating factor for the development of this activity in the everyday life.

There are methodological limits to be considered. Because the procurement process depends on multiple factors and some of them were not measured in this study, there is not accurate information about how they affect the production and quality indicators. Factors such as therapeutics limits, days of disease evolution and hospitalization, family idiosyncrasies, religion, politics, and death belief could not be controlled for.

Table 1. Professionals Trained Through Procurement Clinical Simulation Workshops

		Sex		Profession		
Workshops	Professionals	Female	Male	Doctors	Nurses	Other
60	435	250	185	235	165	35

Source: Hospital El Cruce Simulation Center.

RESULTS

During period 2, 435 professionals received training through the PCSW; 91 of them were from the HEC, 235 were doctors, and 165 were nurses (Table 1).

The most important production indicators of organ and tissue procurement for transplantation in period 1 were, 42 eligible brain death donors, 20 utilized donors, and 11 tissue donors; the major quality indicators were 47.5% refusal of organ donation in brain death index and 23.1% refusal of tissue donation in circulatory death index. This yielded the organ transplantation for 44 recipients and tissue transplantation for 64 recipients (Table 2).

In period 2, the indicators were as follows: 56 eligible brain death donors, 28 utilized donors, 43 tissue donors, 36.7% refusal of organ donation in brain death index, and 14.6% refusal of tissue donation in circulatory death index. This yielded organ transplantation for 71 recipients and tissue transplantation for 116 recipients (Table 2).

From our assessment of the two periods, it arises that the production and quality indicators of organ and tissue procurement for transplantation in the HEC improved in the second period. This improvement is the result of the set of tasks carried out in the hospital, treatment of neurocritical patients, management of the application of the specific subprograms, communication with the family, and training of the health care staff. Continuous training through PCSW is highlighted within said tasks.

Table 2. Production and Quality Indicators Comparison Between Periods 1 and 2

Indicators	Period 1	Period 2	Difference
CDP	219	481	þ119.6%
PBDD	170	307	þ80.5%
EBDD	42	56	þ33.3%
UD	20	28	þ40%
CR	47.6%	50%	þ2.4%
%MD	65%	85.71%	þ20.7%
RDBDI	47.5%	36.7%	—10.8%
PCDD	29	155	þ434.4%
TD	11	43	þ290.9%
RTDCDI	23.1%	14.6%	—8.5%
D	639	793	þ24%
OTP	44	71	þ61.3%
TTP	64	116	þ81.2%

Abbreviations: CDP, considered donation processes; CR, conversion rate; EBDD, eligible brain death donors; %MD, percentage of multiorgan donors; OTP, organ transplant patients; PBDD, potential brain death donors; PCDD, potential circulatory death donors; RDBDI, refusal of organ donation in brain death index; RTDCDI, refusal of tissue donation in circulatory death index; TD, tissues donors; D, total deaths; TTP, tissue transplant patients; UD, utilized donors.

Source: National Procurement and Transplant Informatic System of the Argentine Republic (SINTRA).

This study defines a relationship between competence and indicators of improvement; it aimed to identify different processes to be taught through clinical simulation, and the results were measured in health care practice. More research is needed to identify competencies and to assess how clinical simulation training modifies results. It would be appropriate to identify the health care staff, their specific role in the procurement process, and assess the results in a more personal way.

ACKNOWLEDGMENTS

The authors thank the collaboration of Hospital El Cruce Simula- tion Center and Hospital El Cruce Research Department.

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