EVALUATION OF PATIENT SAFETY DURING CARDIAC SURGERY AT A PUBLIC HOSPITAL

Avaliação da segurança do paciente em cirurgia cardíaca de um hospital público

Evaluación de la seguridad del paciente en cirugía cardíaca de un hospital público

Marcia Bergamo Giannattasio[1], Fabio Papa Taniguchi[2]

ABSTRACT: Objective: Evaluation of security items in cardiac surgery at a public hospital. **Methods:** Cross-sectional descriptive study. Data collection was performed in 2012 at a public state-owned hospital, where 30 cardiac surgeries were observed and evaluated through a script based on the 3 steps of the World Health Organization (WHO) surgical safety checklist. Procedures were categorized as "in conformance" or "in non-conformance." **Results:** Non-conformance results made up 56% of cases before anesthetic induction, 57% prior to the procedure, and 75% of cases before leaving the operating room. **Conclusions:** Though the WHO checklist is indispensable, professional training and continuing education remain crucial for training a critical health care team that is aware of its role in securing patient safety.

Keywords: Perioperative nursing. Checklist. Quality Management.

RESUMO: Objetivo: Avaliar itens de segurança na cirurgia cardíaca em pacientes de um hospital público. **Método:** Estudo descritivo e transversal. A coleta de dados, desenvolvida em 2012, foi realizada em uma instituição hospitalar pública estadual, onde foram observadas 30 cirurgias cardíacas por meio de um roteiro embasado nas 3 fases do *checklist* de cirurgia segura da Organização Mundial da Saúde (OMS), com alternativas descritas como "em conformidade" e "em não conformidade". **Resultados:** Os resultados de não conformidade corresponderam a 56% dos casos antes da indução anestésica, 57% antes do procedimento e 75% na saída da sala de cirurgia. **Conclusão:** O *checklist* da OMS se faz necessário, porém, o treinamento profissional e a educação permanente constituem a linha mestra para a formação de uma equipe de saúde crítica e consciente do seu papel na segurança dos pacientes.

Palavras-chave: Enfermagem perioperatória. Lista de checagem. Gestão de qualidade.

RESUMEN: Objetivo: Evaluar ítems de seguridad en la cirugía cardíaca en pacientes de un hospital público. **Método:** Estudio descriptivo y transversal. La colecta de datos, desarrollada en 2012, fue realizada en una institución hospitalaria pública estadual, donde fueron observadas 30 cirugías cardíacas por medio de un itinerario basado en las 3 fases del *checklist* de cirugía segura de la Organización Mundial de la Salud (OMS), con alternativas descritas como "en conformidad" y "en no conformidad". **Resultados:** Los resultados de no conformidad correspondieron al 56% de los casos antes de la inducción anestésica, un 57% antes del procedimiento y un 75% en la salida del quirófano. **Conclusión:** El *checklist* de la OMS se hace necesario, sin embargo, la capacitación profesional y la educación permanente constituyen la línea maestra para la formación de un equipo de salud crítico y consciente de su papel en la seguridad de los pacientes.

Palavras clave: Enfermería perioperatoria. Lista de verificación. Gestión de la calidad.

[1]Health Sciences graduate student at the Instituto de Assistência Médica ao Servidor Público Estadual – IAMSPE. E-mail: sergmarc@uol.com.br
Rua dos Donatários, 39 Apt. 52 – Mooca CEP 03167-010 – São Paulo (SP), Brazil.
[2]PhD in Medical Surgery by the Universidade Estadual Paulista "Júlio de Mesquita Filho" – São Paulo (SP), Brazil.
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INSTRODUCTION

To err is human, published in the United States in 1999, describes how mistakes can happen frequently during medical care, leading to thousands of deaths and irreparable damage. Medical errors are the eighth leading cause of death in this country, despite huge investments in this sector. Though not scientific, *To err is human* sparked changes and promoted huge developments in research and practical measures for promoting patient safety not only in the United States, but throughout the world[1].

According to the World Health Organization (WHO), tens of millions of patients worldwide are victims of incapacitating injuries or deaths due to unsafe practices in health every year.[2] These mistakes affect 1 in 10 patients, on average, an estimate that is even more serious in developing countries, in which 1 patient dies for each 300 that were admitted to hospitals[2].

Faced with this scenario, WHO launched the World Alliance for Patient Safety in October 2004, an initiative aimed at describing challenges for patient safety.

One of the products of the Alliance was the Safe Surgeries Save Lives program, based on the use of a transoperative checklist which allows for a full evaluation of the patient. This checklist is divided into three steps: before induction of anesthesia; before the beginning of the surgery; and before the patient leaves the operating room, while also taking into account that different sets of practices may adapt the patient to their own circumstances[2].

A survey conducted in two Brazilian hospitals found that, out of the 1,103 patients studied, 56 suffered adverse events. Infections associated to health care and surgery or anesthesia-related complications made up 44.6% of the damage[3]. Another study, conducted in 2008, showed that 1 in every 150 hospitalized patients dies as a result of an incident, and that almost two thirds of adverse events were related to surgical assistance[4].

Several reasons are listed for the occurrence of adverse effects in surgery, such as communication problems and distraction within the multiprofessional surgical team; the lack of checking of patient identification and of materials during the procedure, among other relevant indicators to measure the susceptibility of errors[4].

It is noteworthy that surgical checklists have been effective in minimizing adverse events, increasing patient safety.

In this context, checklist usage in Brazilian hospitals has been increasing, alongside with investment in team work and the development of protocols and indicators relevant to the subject. Public agencies and professionals in Brazil develop strategies to aid institutions, the greatest achievement of which was the enactment of the Ministry of Health Decree n. 529/2013, focused on the National Program for Patient Safety, an instrument that provides multiple protocols, standards, and guidelines to be applied by hospitals for ensuring patient safety[5].

It is our belief that, although institutions are concerned with patient safety, it is necessary to insist on the observance of good practices in surgical care. With that in mind, the following question sprung: can a surgical procedure be safe without the use of the checklist?

Considering that security must be taken into account in all surgical procedures, we specified a study on the anesthetic procedures in cardiac surgery, because of their high complexity and their high appreciation in Brazil. Published by the Brazilian Society of Cardiovascular Surgery ("Sociedade Brasileira de Cirurgias Cardiovasculares" - SBCCV), the research places Brazil as the world second in number of heart surgeries performed per year, with about 102 thousand surgeries/year, behind only the United States[6].

OBJECTIVE

To assess conformity to the WHO Surgical Safety Checklist in cardiac surgeries performed at a public hospital.

METHODS

Cross-sectional observational study: after approval by the Research Ethics Committee of the institution involved, this research was conducted in March 2012, at the surgical center of the Public servant state hospital of São Paulo ("Hospital do Servidor Público Estadual de São Paulo"), registered in the National Information System for Research Ethics ("Sistema Nacional de Informação sobre Ética em Pesquisa" - SISNEP) under protocol FR-441480.

We observed 30 different variables, which comprise our systematized observation form adapted to the WHO checklist. As inclusion criteria, we selected midsternal thoracotomy cardiac surgery elective procedures, with cardiopulmonary bypass (CPB) in patients over 21 years of both sexes. In full, 30 procedures were followed, a significant sample which represented 68.18% of the total of cardiac surgeries performed at the institution during the data collection period.

Variables were divided into steps: first, the observed was properly identified; second, 19 items were checked before induction of anesthesia; third, 7 items were evaluated before the start of the surgical procedure; in the fourth step, 4 items were analyzed before the patient left the operating room. These items were recorded through binary nominal categorization, thus each item had two possible answers: "yes" (in conformance) or "no" (in non-conformance).

Data are presented through absolute numbers and percentages, and underwent descriptive statistical analysis with the aid of *Microsoft Excel*®.

RESULTS

In step 1, of the 30 procedures observed, 70% (n=21) of the patients were male and 43% (n=13) aged between 61 and 70 years. As to the procedure performed, 90% (n=27) of patients underwent coronary artery bypass grafting.

Before the induction of anesthesia (second step), 8 (44%) out of 19 items observed were found to be "in conformance," while 11 (56%) did not conform. In the third step, 4 out of 7 (57%) items were "in conformance" and 3 (43%) "in non-conformance." In the fourth and last step, we found 1 (25%) item "in conformance" and 3 (75%) "in non-conformance" (Chart 1).

Out of the 30 items observed, 17 (57%) were considered as "in non-conformance".

DISCUSSION

First step: identification data

There were more males than females. In a study conducted in Southern Brazil, the epidemiological profile of patients undergoing cardiac surgery shows that the majority of procedures are made up of coronary artery bypass surgeries performed in patients over 70 years of age. Such findings are consistent with this study[7].

Second step: before induction of anesthesia

Data show that patient identification is not performed, despite being required by Law 10,241 of March 17, 1999, which deals with the rights of patients and users of public health services in the State of São Paulo and which dictates that patients have a right to be identified[8].

American healthcare accreditation organization Joint Commission International started a national challenge for patient safety, alerting about the importance and necessity of inclusion of identification bracelets. In light of the occurrence of mistakes related to inadequate patient identification, the challenge remains an important goal for healthcare institutions seeking quality certification[9].

In our analysis, we observed that the surgical staff knows the patient, but at any time there is a check of the patient with the whole team in the operating room.

Studies that aim to qualify the communication among units and rigorous checking of patient identification data are quite frequent[3,4]. We questioned the lack of informed consent for surgery and anesthesia of the patient, given this is performed in other sectors of the institution. It is clear that surgical treatment should be done with a focus on the patient as an individual, with clear information, and analysis of risks and benefits focused on that particular patient, as well as information about citizen's rights and medical professionals' responsibilities[8]. We found that though this practice exists on the part of the surgeons and anesthesiologists, it is often the case that informed and signed consent by the patient is lacking.

The lack of conformance in relation to knowledge about patient allergies raises questions about the increased possibility of adverse events.

In the United States, at least 1.5 million people are affected each year as a result of incorrect administration of drugs. A study found that perioperative errors contribute significantly to this statistic, and suggested a number of reasons for this, among which is the lack of knowledge about the patient allergies[2].

The American Society of Anesthesiologists' project *Closed Claims* pointed out that mistakes in drug administration of have resulted in serious problems, including death in 24% of cases reviewed and morbidity in 34% of them[10].

Although it is difficult to provide a precise estimate for the extent of damage that can be attributed to perioperative medication errors, it is almost certain that harmful errors are underreported. Reflecting on this problem and considering that it is appropriate to check for possible patient allergies, we believe that undesirable allergy-related complications can be prevented if there is a systematic and effective communication among members of the care team.

We also observed communication problems due to absence of a complete surgical team in the operating room, a situation that suggests poor communication among professionals. Although the nursing team was present, its members often had to leave the room to fetch surgical material, indicating an inadequate preparation the operating room. Everyone involved in the anesthetic-surgical procedure must stay in room constantly, thus avoiding

Chart 1. Results of the systematized observation form adapted to the World Health Organization checklist. São Paulo (SP), 2012.

Items observed		Yes	%	No	%
		In conformance		In non-conformance	
Before induction of anesthesia					
1	Patient identification - Wristband	3	10	27	90
2	Medical records checked	–	0	30	100
3	Informed consent	–	0	30	100
4	Patient has known allergies	–	0	30	100
5	Presence of surgical team in the operating room during anesthesia	–	0	30	100
6	Presence of nursing team in the operating room during anesthesia	30	100	–	0
7	Monitoring	30	100	–	0
8	Checking of anesthetic equipment	30	100	–	0
9	Difficult airway detected	–	0	30	100
10	Presence of specific equipment for difficult airways	–	0	30	100
11	Antimicrobial prophylaxis performed 30 to 60 minutes before incision	–	0	30	100
12	Equipment with chemical indicators	–	0	30	100
13	Presence of equipment and accessories in the room	30	100	–	0
14	Checking of consigned products in the room	30	100	–	0
15	Presence of CPB and accessories in the room	30	100	–	0
16	Blood refitting in the room	–	0	30	100
17	Preparation of materials for venous and arterial access	30	100	–	0
18	Preparation of materials for urinary catheterization	30	100	–	0
19	Imaging exams present	–	0	30	100
Before surgical incision					
20	ID wristband kept on	–	0	30	100
21	Complete surgical team present	–	0	30	100
22	Nursing team present	30	100	–	0
23	Patient observed	30	100	–	0
24	Defibrillator turned on with internal paddles	30	100	–	0
25	CPB set up	30	100	–	0
26	Occurrence of critical anticipated events	–	0	30	100
Before patient left the room					
27	Recordings performed	30	100	–	0
28	Equipment and gauze count	–	0	30	100
29	Wristband ID check	–	0	30	100
30	Safe transfer	–	0	30	100

CPB: cardiopulmonary bypass.

communication failures, which are considered a factor of uncertainty[2].

Another concern of the authors is related to anesthetic procedures, given there is no systematic equipment checking. Checking is often made individually and discretionarily by the anesthetist, which may cause unexpected but avoidable complications.

Reliable anesthesiology depends on careful preparation, which involves not only systematic checking by the anesthetist moments before the procedure, but also preventive, daily and permanent maintenance of all anesthetic equipment by other professionals familiar with the equipment[11].

We consider the risks inherent to surgical infection to be quite expressive, given that observed data have demonstrated inappropriate antimicrobial prophylaxis, unsafe aseptic techniques during the preparation of venous accesses, and urinary catheterization as well as a lack of chemical indicators in the equipment used. Cardiac surgery is, due to its high complexity, inherently more vulnerable to infections, and the observed practices contribute to increase this risk.

A study suggests antimicrobial prophylaxis is recommended whenever there is a high risk of infection, as is the case of elderly patients, diabetics and immunocompromised patients, as well as in high complexity surgeries which include the use of prosthetics. Improper use of this technique may favor natural selection of resistant bacterial strains. American researchers agree that, in general, the drug should be administered between 30 and 60 minutes before incision[12].

However, the use of antibiotics during prophylaxis is not the most important measure for preventing surgical infections; risk identification, adequate pre-operative preparation, and the use of aseptic surgical techniques are essential practices for a good result. Furthermore, the surgical environment must be kept clean, including surgical scrubs and instruments.[12,13].

A paper revealed that, in 83% of cases studied, patient safety was compromised due to exposure and transmission of micro-organisms during anesthetic surgery which occurred as consequence of negative behaviors by the operating team.[13]

Equipment and accessory checking was found to be "in conformance." This is also considered an important factor in avoiding stress during surgery; however, we did not observe systematic checking involving the whole team, as only the circulating nurse was responsible for it.

CPB and equipment checking and control were performed in conformance with the checklist, but were always performed individually by the perfusionist responsible.

In cardiac surgeries it is routine procedure to have blood replacement in the operating room, but no such practice was observed. In a specific study on the risks faced by high complexity surgery patients during the intraoperative period, the matter of imbalance in the volume of liquids is mentioned[13].

When analyzing this step, the most significant items we observed were ineffective communication among team members, lacking of patient identification, and risk of infections.

Third step: prior to surgical incision

In this step, we observed a constant lack of patient identification and an incomplete surgical team, factors that contribute to an unsafe surgery; however, surgical procedures were initiated with perfect patient monitoring through the use of equipment and accessories made specifically the procedure, which brought us some comfort.

The WHO suggests this step should include effective team communication about possible anticipated events, which was not observed[2].

Though surgical teams seem to recognize that communication failures can represent a great obstacle to safe and effective care, such failures were nonetheless observed.[4,13]

It is the authors' view that the most relevant issue in this step was the lack of effective team communication.

Fourth step: before the patient leaves the operating room

In this step, we observed there was no routine for checking and counting surgical equipment after the procedure. The WHO manual describes the importance keeping track of equipment in the operating room, including the creation of specific rules regarding when and by whom surgical counts should be performed, which items should be counted and how counting should be documented.[2]

The Regional Board of Medicine of the State of São Paulo states that, after surgery, it is mandatory to count compresses, which should be verified and confirmed by the surgeon. In case of any doubt over the number of compresses, a radiography of the surgical site should be requested.

A Brazilian study states that any surgery represents a professional act performed by several professionals (members of the surgery team, an anesthesiologist, and room nurses), raising questions on the limits of surgeons' responsibility over other team members' mistakes, given the clear division of tasks in any surgery.[15] In this context, we emphasize the importance of using the WHO checklist, an activity that must be performed by the entire team, thus making all members responsible for a safe surgery.

In this step, we observed a continued lack of patient identification, something that could prove even more dangerous and unsafe in the case of a hospital transfer, which increases patient vulnerability and may lead them to undergo incorrect procedures.

Patient transportation was performed by the surgical team followed by circulating personnel, but no nurse was seen in any case observed.

A study describes that during patient transportation from the operating room to intensive or semi-intensive care units, it is ideal that the nurse should follow the transportation along with the anesthetic surgical team, passing the call to nurses of that unit[16], events not observed in our research. We observed that though the team was concerned with securing patient transportation, the lack of adequate equipment slowed down the transfer, causing delays and increasing risks for the patient.

In this last step, patient identification was the major cause of concern.

CONCLUSION

Health institutions wish to improve their patients' safety; therefore, we suggest that, before any action, it is necessary to invest in an internal patient safety policy as the first and most important guideline of institutional planning. It is important to promote the goals of the Safe Surgeries Save Lives program and its importance for all health professionals, making it a collective commitment.

For us, observing surgical security flaws in a given surgical center demonstrates a clear need to make use of surgical checklists in such institution. However, the greater challenge is not simply printing sheets of paper, but focusing on patient safety throughout the institution, so that the checklist is not another form to be filled, but an effective safety instrument.

With this study, we support the need for immediate action toward investment in continuous patient identification and increasing effectiveness of communication among team members, given that our findings in this area were unfavorable and relevant. It is also necessary to understand that the prevalence of unsafe practices related to the surgical infection increases surgical risks. Therefore, we suggest the immediate correction of such practices with the help of continuous training of all professionals involved in surgical procedures.

We conclude that the checklist is necessary to increase safety during cardiac surgeries in this institution. Though operating teams presented a positive work flow, procedures presented problems that could be avoided through conscientious usage of the checklist.

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