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Active post-operative phoned search for late infections of surgical site and thromboembolic events in the late postoperative period of plastic surgeries in a day hospital in the municipality of Porto Alegre

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ABSTRACT

Introduction: Elective and plastic surgical procedures are normally considered safer than emergency surgeries, although they cause concern to health services. The aim of this study was to analyze the active phoned search as a screening instrument for the diagnosis of surgical site infection (SSI) and thromboembolic events (TEs) in the late postoperative care of plastic surgeries in a private day hospital in the city of Porto Alegre.

Methods: Quantitative, descriptive, retrospective, cross-sectional study. Data was collected from a database provided by phoned active search of sign and symptoms for epidemiological monitoring by the control infection service of a day-hospital, from July 2015 to February 2017.

Results: A total of 3.595 patients were effective contacted in the indicated period. Among these patients, 77.6% received guidance on TEs. Moreover, 0.4% and 0.2% of patients reported signs and symptoms of SSI and TE, respectively. Associated procedures caused 50.0% of SSIs and 87.5% of TEs. Phoned search increased in 0.2% the number of reported cases of both adverse events in the overall sample.

Conclusion: SSI and TE are worrying events for health institutions, since they can put patient safety at risk. Therefore, the data obtained in this study were used as a basis to qualify phoned search as an effective screening instrument for SSI and TE and provided support for the development of more consistent phoned search mechanisms for monitoring these postoperative events.

Keywords: *Epidemiological surveillance; infections; thromboembolism; plastic surgery*

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The World Alliance for Patient Safety (WAPS) highlights the need for practices to ensure patient safety and prevent potential damage caused by adverse events[1], defined as events or circumstances that may result or resulted in unnecessary damage to the patient[2]. According to the IT Department of the Brazilian Unified Health System (DATASUS), 739,867 adverse events and/or technical complaints from outpatient clinics, i.e., equipment failure that directly or indirectly affected care provision, were reported in Brazil in 2017, 95.8% of which occurred in the southeast region of the country, 1.6% in the south region, and 2.5% in the other regions[3]. Such events may be related to the increased number of plastic surgeries worldwide, as demonstrated in a report issued by the International Society of Aesthetic Plastic Surgery revealing that, in 2013, 23 million plastic surgeries were performed worldwide. The leading country in the number of surgeries is Brazil, where 1,491,721 more surgeries were performed than in the USA[4].

One of the most common AEs are surgical site infections (SSI), which are those manifesting within the first 30 days after surgery or after 1 year after surgeries for placement of prostheses. SSIs are classified according to the

affected site, and prophylactic antibiotic therapy is recommended to start within the first 2 days after progression of symptoms, regardless of whether SSI is confirmed by medical diagnosis5. These events represent a potential public health problem leading to increased patient's length of hospital stay and thus generating higher costs and increasing morbidity and mortality[5,6].

Patient care indicators show that 1,084,604 nosocomial infections were reported in Brazil in 2017, 98.6% of which occurred in the southeast region of the country, 0.1% in the south region, and 1.3% in the other regions[7]. In addition to SSIs, thromboembolic events (TEs) are another AE that cause concern to hospital teams and are considered risk factors for worse prognosis in surgical patients. There is little evidence on TEs following plastic surgeries. Schwartzman et al.[8] found that one TE occurs every 50,000 plastic surgeries, two thirds of which result in death.

TEs are caused by the formation and migration of blood clots within deep veins. These events are usually asymptomatic and are difficult to diagnose clinically. However, in case of suspected TE, best medical practices recommend requesting imaging studies, such as color Doppler ultrasound, computed tomography angiography, or radiography, to establish the diagnosis[9]. It has been known that SSI and TEs are a potential problem of public health, since the Brazilian Ministry of Health reported a mortality rate of 3.25% for these events in private health facilites[10]. Thus, health care professionals are required to identify both TE and SSI.

Within this context, the Brazilian National Health Surveillance Agency (Agência Nacional de Vigilância Sanitária, ANVISA) establishes that epidemiological surveillance measures should be implemented by Hospital Infection Control Service (Serviço de Controle de Infecção Hospitalar, SCIH) of each hospital[11]. Surveillance of surgical patients may be performed through surveys at surgical outpatient clinics, phoned searches, or written questionnaires, depending on the institution's profile[12].

Therefore, the aim of this study was to analyze the use of active phoned search as an instrument for the diagnosis of SSIs and TEs in the late postoperative period of plastic surgeries, considering the difficulties in implementing phoned search and the scarcity of scientific findings on the use of this method for epidemiological surveillance. Additionally, this study aims to provide support for the development of more consistent phoned search mechanisms for monitoring the above postoperative events.

METHODS

This is a quantitative, descriptive, retrospective, cross-sectional study with a document search approach. The present study was conducted in an outpatient private hospital in the city of Porto Alegre, southern Brazil, which performs reconstructive aesthetic procedures.

Data were obtained from a database including information on an active phoned search for epidemiological surveillance undertaken by the SCIH of the coparticipating institution from July 2015 to February 2017. Phone calls were made 30 days after surgery. Data were recorded on a standardized instrument including patient clinical data, recommendations and prophylactic guidelines on SSI and TE, tabulated on Excel spreadsheets, and expressed as absolute and relative frequencies.

The present study was conducted according to ethical regulations for human subjects research set forth in the Brazilian National Health Council Resolution no. 466/12 and was approved by the Research Ethics Committees of Centro Universitário Ritter dos Reis and the coparticipating institution under Consolidated Opinion no. 2.343.604. The involved researchers are committed to ensure data confidentiality.

RESULTS

A total of 5,531 patients who underwent surgical procedures during the study period were selected for the phoned search. Of these, 65% (3595) were effectively contacted, 34.6% (1,916) were unable to be contacted, and 0.4% (22) had not a registered telephone number. Among those who were effectively contacted, 77.2% (2,777) received guidance on postoperative TEs, 0.4% (16) had suspected SSI, and 0.2% (8) had suspected TE, as shown in Table 1.

Table 2 describes the characteristics of patients with suspected SSI. Of these, 87.5% (14) presented with signs and symptoms of SSI, 81.3% (13) received a prescription for prophylactic antibiotics, but SSI was confirmed in 50% (8) of patients.

Associated surgeries, i.e., undergoing more than one surgical procedure, accounted for 50% (8) of SSIs. An analysis of bacterial growth revealed that growth of methicillin-sensitive *Staphylococcus aureus* (MSSA) was observed in 75% (3) of patients who had biological material - surgical wound (SW) cultures - collected by the primary physician, as shown in Table 3.

Finally, it is worth mentioning that, differently from SSI, only one patient with signs and symptoms of TE were not diagnosed with thromboembolism but reported to have received treatment for pulmonary thromboembolism (Table 4).

Table 1: Population profile of the study sample.

		2015		2016		2017		Overall	
Sex	Female	1,242	96.57%	2019	97.68%	237	97.90%	3,498	97.38%
	Male	44	3.42%	48	2.32%	5	2.07%	97	2.60%
Single procedure		748	58.16%	1,213	58.68%	147	60.74%	2,108	59.20%
Associated procedures		538	41.84%	854	41.32%	95	39.25%	1,487	40.80%
Guidance on TE	Yes	1,134	77.41%	1,477	77.33%	178	80.91%	2,789	78.55%
prophylaxis	No	350	23.58%	433	22.67%	42	19.09%	825	21.78%
Suspected SSI		3	0.23%	10	0.48%	3	1.24%	16	0.65%
Suspected TE		2	0.15%	3	0.15%	1	0.41%	6	0.24%

Associated procedures: those with incisions to more than one site. Guidance on TE prophylaxis: Moving lower limbs with the patient in the sitting or lying position. SSI: surgical site infection; TE: thrombotic event.

Table 2: Cases of suspected surgical site infection reported in post-discharge surveillance by phoned search.

		Absolute number	Relative number
Sex	Female	16	100.0%
Single procedure		7	43.8%
Associated procedures		9	56.3%
Signs of SSI	Yes	14	87.5%
	No	2	12.5%
Suture dehiscence	Yes	6	37.5%
	No	10	62.5%
Time until disease occurrence	Before 15th postoperative day	9	56.2%
	After 15th postoperative day	7	43.8%
Reintervention	Yes	6	37.5%
	No	10	62.5%
Recommendation for prophylactic ABT	Yes	13	81.3%
	No	3	18.8%
International Classification of Diseases code T81: Complications of procedures, not elsewhere classified	SSI	8	50.0%
	Seroma	6	37.5%
	Inflammatory process	1	6.3%
	Not applicable	1	6.3%

Single procedure: those with incisions to one site. Associated procedures: those with incisions to more than one site. Reintervention: seek for medical and hospital care. ABT: antibiotic therapy; SSI: surgical site infection.

Table 3: Confirmed cases of SSI reported in post-discharge surveillance by phoned search.

		Absolute number	Relative number
Sex	Female	8	100.0%
Single procedure		4	50.0%
Multiple procedures		4	50.0%
Signs of SSI	Yes	8	100.0%
	No	0	0.0%
Suture dehiscence	Yes	1	12.5%
	No	7	87.5%
Time until disease occurrence	Before 15th postoperative day	5	62.5%
	After 15th postoperative day	3	37.5%
Reintervention	Yes	4	50.0%
	No	4	50.0%
Recommendation for prophylactic ABT	Yes	8	100.0%
	No	0	0.0%
Collection of cultures	Yes	4	50.0%
	No	4	50.0%
Microorganism	MSSA	3	75.0%
	None	1	25.0%

Single procedure: those with incisions to one site. Multiple Procedures: those with incisions to more than one site. Reintervention: seek for medical and hospital care. ABT: antibiotic therapy; MSSA: methicillin-sensitive *Staphylococcus aureus*; SSI: surgical site infection.

Table 4: Cases of suspected TEs reported in post-discharge surveillance by phoned search.

		Absolute number	Relative number
Female		8	100.0%
Single procedure		1	12.5%
Associated procedures		7	87.5%
Guidance of TE prophylaxis	Yes:	7	87.5%
	No	1	12.5%
Signs of TE	Yes	8	100.0%
Time until disease occurrence	Before 15th postoperative day	5	62.5%
	After 15th postoperative day	3	37.5%
Seek for medical assistance	Yes	8	100.0%
	No	0	0.0%
Imaging tests	Doppler ultrasound	4	50.0%
	Doppler ultrasound + radiography	2	25.0%
	Computed tomography angiography	1	12.5%
	Computed tomography angiography + radiography	1	12.5%
Hospitalization	Yes	4	50.0%
	No	4	50.0%
International Classification of Diseases code I82: Other venous embolism and thrombosis	Deep vein thrombosis	5	57.1%
	Pulmonary thromboembolism	1	14.3%
	Pulmonary embolism	1	14.3%
	No diagnosis	1	14.3%

Single procedure: those with incisions to one site. Associated procedures: those with incisions to more than one site. TE: thromboembolic events.

DISCUSSION

Study results show a predominance of females (97.3%; 3,498) and presence of signs and symptoms of SSI (87.5%; 14 out of 16 patients with suspected SSI) and TE (100%; 8 patients with suspected TE). We observed that the disease occurred before the 15th operative day in 56.2% (9 out of 16) of patients with suspected SSI and in 62.5% (5 out of 8) of patients with suspected TE. Rates of suspected SSI (0.4%;16 out of 3595) and TE (0.2%;8 out of 3595) observed after phoned search were low, which may be explained by the fact that only 65% of patients were effectively contacted.

These findings increase concern with patient safety, since SSIs and TEs are known to be major hospital problems, because of their high incidence and significant impact on patients, leading to health complications, increased length of hospital stay, and death[5,12-14]. Some factors may contribute to infectious and thromboembolic processes, such as operative time, number of incisions, use of prosthesis, and patient-specific characteristics[5,12-16]. Associated procedures accounted for 50% (4 out of 8) of SSIs and 87.5% (7 out of 8) of TEs, which corroborated other studies that assessed the prevalence of SSI and TEs in multiple clean surgeries using a post-discharge search approach[16-18]. Studies conducted in the states of São Paulo, Distrito Federal, and Minas Gerais found that most signs and symptoms of SSI manifested before the 15th postoperative day, confirming results from the present study, which found that 62.5% of cases of suspected SSI occurred during this period[17,19,20].

With regard to microbial analysis of SW cultures, our results are consistent with those of a retrospective study conducted by Batista and Rodrigues[16] in 2012 showing that MSSA was the predominant microorganism in SSI (40.4%). This germ predominantly colonizes the skin and may be originated from the patient him/herself, the surgical team, and/or the environment (including surgical material)[5,15,16]. Current studies on techniques for post-discharge search are in line with a retrospective study conducted by Klein et al. which concluded that there is no gold standard method for the surveillance of SSIs. Thus, SCIHs are recommended to assess the most appropriate surveillance approach according to their realities[12-14,16,17,19,21-23].

In the present study, outpatient follow-up through phoned search increased in 0.2% the number of reported SSI (8 out of 3,595) and TE (7 out of 3,595). Such findings are consistent with those of another study that found lower SSI rates in clean outpatient surgeries[22]. In line with our results, a study by Oliveira in the state of Minas Gerais, Brazil, reported that 53% of the sample were effectively contacted[19]

vs. 65.0% in the present study. It is worth noting that the process of surveillance is essential to increase accuracy, achieve more reliable indicators, and reduce underreporting[17,18,20]. Phoned search is a low cost and easy to perform method with importance on health care services and patient safety[12,13,20]. However, the low rates of effective contact reported in different studies result in a significantly reduced sample, especially if phone calls are made during business hours.

Additionally, diagnosis sensitivity is a key point in this method, since the patient is a layperson who may provide a doubtful description of SW leading to overreporting, in addition to the risk of recall bias[12,13,17,19]. It should be reaffirmed that there is no single standard method for the surveillance of SSI; however, regardless of the method, diagnostic criteria for SSI established by ANVISA should be met[11-14,16,17,19-21]. Additionally, SCIHs should include search for TEs in their postoperative follow-up strategy, because of its high mortality rate and involvement in associated and extensive surgeries[5,12,13,19,20]. In order to improve care practices and institutional indicators and to solve the scarcity and/or absence of studies on post-discharge search, further studies are recommended to assess the implementation of different methods and their results in the active search aimed at controlling SSIs and TEs. Finally, it was possible to meet the objective of the present study, since the use of active phoned search as a screening method to diagnose SSIs and TEs has some limitations, such as the low number of effective contacts, but is an excellent method, considering the profile of the coparticipating institution, which can yield more reliable indicators and improve the care processes.

Conflicts of Interest

The authors declare no conflicts of interest.

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