

# The value of calling-back patients to detect surgical site infections following orthopaedic and neurological surgeries in a tertiary care centre in Lebanon

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## Abstract

Surgical site infections (SSIs) are a major source of morbidity, mortality and increased medical costs among patients undergoing surgeries. Surgical site infections may be detected during hospitalization following surgery, upon readmission, through Emergency Department or clinic visits. Calling-back patients might be used to detect SSIs in patients who seek medical care in different centres. An active, patient-based, prospective surveillance for SSI following orthopaedic and neurological procedures was conducted between July and September 2016 at the American University of Beirut Medical Centre (AUBMC).

Trained infection control professionals conducted the surveillance based on the CDC/NHSN (Centers for Disease Control and Prevention/National Healthcare Safety Network) definition of SSI and the NHSN methodology for data collection by calling-back patients and assessing the signs and symptoms of SSIs at 30 or 90 days after the operative procedure using a standardized checklist. Calling-back patients was initiated following an increase in the SSI rates for particular surgeons in these specialties. Rates were expressed as number of SSI in a designated specialty per 100 operative procedures of the same specialty and were benchmarked with NHSN and the International Nosocomial Infection Control Consortium (INICC) rates.

No SSIs were identified through the phone calls among the 178 patients who were assessed throughout the surveillance period, whereas two SSIs were identified through the routine surveillance of hospital re-admissions and one SSI was identified from the review of the outpatient clinic records. Surgical site infection rates remained unchanged compared to the adopted surveillance methodology and were 3.7% following neurological surgeries and zero following orthopaedic surgeries at the time of the active surveillance.

Call-back programs may be beneficial to obtain additional post-discharge surveillance information. However, patients may have a difficult time assessing their status and the possibility of developing an SSI. Moreover, this process was found to be time consuming, and was not successful in identifying additional SSIs. Reassessment of this method is essential to examine the value of calling-back patients in detecting SSIs.

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## Introduction

Surgical site infections (SSIs) continue to be a major source of morbidity and mortality among patients undergoing surgical procedures despite major advances in infection prevention strategies. The SSI severity ranges from superficial wound infection to organ/space involvement that could become life threatening. The risk factors associated with SSI are multi-factorial and vary according to the wound classification, the American Society of Anaesthesiology (ASA) score, hospitalization prior to the surgical procedure, and patient related risk factors such as immuno-suppression, diabetes, obesity, smoking, lifestyle, age and previous surgeries. Hospital related risk factors include non-compliance with the elements of the SSI prevention bundle such as antimicrobial prophylaxis (timing, choice of drug, and dosage), maintaining perioperative normothermia and glycaemic control in addition to break in sterile technique, improper skin preparation and prolonged operative procedures.<sup>1-3</sup> Surgical site infection surveillance is an essential element of an effective infection prevention program, it is used to reduce the incidence of infections by identifying risk factors, implementing risk-reduction strategies and monitoring the efficiency of interventions. Surgical site infection surveillance programs play an important role in prioritizing and targeting performance improvement and risk assessment activities in healthcare organizations.

Surgical site infections may be detected during the same hospitalization, upon readmission, through the Emergency Department (ED), or during outpatient visits. Different surveillance methodologies are adopted and include review of the patients' medical records and monitoring microbiological reports of wound cultures.<sup>4</sup> However, reporting SSI is challenging and is underestimated due to several factors such as readmitting patients to other facilities, treating patients with antibiotics without admission or missing to identify the SSI upon readmission of patients. In view of that, the implementation of effective improvement strategies may be affected especially when the real rate of SSI is unknown.

## Methods

Surveillance to detect SSIs at the American University of Beirut Medical Centre (AUBMC) was implemented

since more than 30 years and is still ongoing based on the most updated CDC/NHSN (Centers Disease Control and Prevention/National Healthcare Safety Network) definitions of SSI and the NHSN methodology for data collection. The AUBMC is a private 387-bed academic tertiary-care centre providing medical, surgical, paediatrics and obstetrics/gynaecological amongst other specialized practices. The Operating Room (OR) is an integral part of the institution, it provides services to surgical patients according to standards of care with the application of scientific knowledge and best practices. It provides care to all populations, regardless of gender, colour, religion and nationality. Elective, late elective and urgent cases in ten operating theatres that can accommodate all types of surgeries including general, neurology, orthopaedic, ENT, ophthalmology, cardiothoracic, obstetrics/gynaecology, vascular, plastic, urology, paediatric, liver and kidney transplant in addition to one operating theatre dedicated for robotic surgery.

The current surveillance methodology used by the infection control program at AUBMC is a prospective patient-based SSI surveillance and includes the daily monitoring of microbiological results of wounds, tissue and body-fluid cultures and the subsequent review of the patient's medical record including the Infectious Diseases consultation notes, reporting of SSI by the medical and nursing teams to the infection control team, the daily review of admitting diagnosis for all patients presenting to the Emergency Department in addition to the review of the outpatient clinic records.

This methodology was considered suitable for the detection of SSI in conjunction with instructing the patient to report any signs and symptoms of SSI, in addition to the obligatory reporting of any suspected or confirmed SSI by all medical and surgical teams. Furthermore, our Medical Centre is part of the American College of Surgeons National Surgical Quality Improvement Program to measure and improve the quality of surgical care following targeted surgeries.

An increase in the SSI rate of 3.8% in neurosurgical procedure (4 SSI out of 105 procedures) in the second quarter (Q2) of 2016 compared to 0% (0/93) in Q1

2016 was noted. In addition, there was an increase in the SSI rate of orthopaedic procedures of 4% (8/199) in Q2 compared to 2.3% (4/173) in the first quarter. As part of an action plan to ensure that all SSIs post orthopaedic and neurosurgical procedures are being detected, the Infection Control Program (ICP) embarked on a strategy to call back patients after discharge at 30 and 90 days following surgery from July 2016 till September 2016.

A standardized checklist was generated based on the CDC/NHSN definitions and protocols of SSI. The checklist included eleven questions, aiming at assessing signs and symptoms such as fever ( $>38^{\circ}\text{C}$ ), pus, pain/tenderness, localized swelling, erythema, heat, wound dehiscence, abscesses. Other questions were related to the potential visits to any health care setting (outpatient clinic, hospital or pharmacy) for wound examination, opening/aspiration of the wound by a physician and administration of any type of antibiotics. An open ended question was left to the patient for any additional information or complication related to the surgical procedure. Responses to this question were rather focused on details related to hospital stay, follow-up with surgeons, and overall patients' satisfaction with their hospital experience.

## Results

A total of 178 patients who underwent orthopaedic and neurological procedures during the study period (July to September 2016) were called-back to assess for the presence of signs and symptoms of SSIs at 30 and 90 days after the operative procedure. No SSIs were identified through the phone calls among the 178 patients who were assessed throughout the surveillance period. However, two SSI were detected using the method of routine surveillance of re-admissions to AUBMC, and another one from the review of the outpatient clinic records.

SSI rates remained unchanged using the current surveillance methodology. For the neurosurgical procedures, the rates were 3.7% (3 SSI out of 82 surgeries) during the study period as compared to 3.8% (4/105) in the previous quarter, whereas for orthopaedic surgeries, the rate was 0% (0/96) compared to 4.0% (8/199) in the previous quarter (April to June 2016).

## Discussion and Conclusion

This call-back method, compared to the established SSI surveillance at our centre, has strengths and weaknesses. The routine surveillance is reliable as it is based on the CDC/NHSN methodology. However, failing to detect SSI is possible due to several factors, such as loss to follow-up patients or conducting diagnostic tests at other healthcare facilities. The call-back method was at times beneficial in obtaining additional post-discharge medical information such as wound status, clinical improvement, or pain that is unrelated to an infectious process and associated with frequent clinic visits. In fact, many patients were grateful for checking back on them after their discharge. Moreover, this method was considered valuable for patients who expect post-operative follow-up, it is cost-effective and may reduce the number of unnecessary outpatient visits as seen in other published papers.<sup>5-8</sup>

On the other hand, some patients had difficulties in assessing their status and the likelihood of developing a SSI. Others were anxious in response to our personalized calls and worried that this could imply a lack of trust in the surgical procedure outcome. Such patients were reassured after the call.

Furthermore, this process was found to be time consuming for the ICP team. Most of the patients were not available at the first and even second call. The duration of the calls was also lengthy for some patients and varied between five and 15 minutes. It also caused substantial resource utilization and did not allow the detection of additional SSIs that were not picked by our routine surveillance process. Some studies were consistent with our findings whereby calling back patients was found to be imperfect but might trigger the need for clinical diagnosis,<sup>9,10</sup> while other reports showed that using telephone calls as a post-discharge method for SSI detection is effective.<sup>11,12</sup> Furthermore, one report showed that phone calls for post-discharge surveillance was more effective than medical chart reviews during hospitalization.<sup>13</sup>

The improvement in the SSI rates at our centre may also be due to the multifaceted IC interventions that were implemented. Such interventions included intensified rounds of the IC team to the OR premises for prompt interventions, monitoring of all elements

of the SSI prevention bundle, supervised cleaning and disinfection activities as well as weekly meetings with the specific surgeons. In conclusion, although this limited study failed to show that calling back patients post-discharge affected the SSI rates that are routinely detected by our surveillance method at our institution, further large prospective studies are needed to generate conclusive evidence.

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