Promoting safe surgery in open reduction internal fixation (ORIF) in close fractures of the lower limb (LL) in a tertiary hospital in Malaysia- A preliminary study

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Introduction

Surgical site infection (SSI) is one of the complications that causes substantial morbidity and incurs high costs in patients post open reduction internal fixation (ORIF) in closed fractures of the lower limb (LL) [1].

However, this complication can be prevented by implementing appropriate evidence based practices [2].

Aim

To assess the impact of implementation and compliance of a SSI bundle checklist on the incidence of SSIs in open reduction internal fixation (ORIF) in closed fractures of the lower limb (LL) in UMMC.

Figure 1: The model of improvement used in quality improvement programme to promote safe surgery in open reduction internal fixation (ORIF) in close fracture of the lower limb (LL) requiring internal fixation or joint replacement.

Methodology

A quality improvement project

Setting: University Malaya Medical Centre (UMMC)

Period of study: Pre-intervention: February-April 2018;
Post-intervention: September 2018 to January 2019

Inclusion criteria: Adult patients with closed fracture of the LL who required internal fixation or joint replacement , who had undergone primary elective ORIF admitted in two orthopaedic wards and were under the management of a single trauma team.

Study procedure:

A gap analysis was conducted by the infection control and preventionist (ICP) and orthopaedic surgeons to examine the current perioperative practices in ORIF surgeries using the *APSIC Surgical Site Assessment Tool (ASSAT).*

Gaps identified were:(i) absence of existing SSI surveillance for ORIFs; (ii) No standardised practice and documentation of perioperative procedures.

A model for improvement was used as the framework to guide this quality improvement programme (Figure 1)

1

Pre-intervention SSI rates and compliance to perioperative processes a were extracted from the electronic medical records (EMR) and Operation theatre (OT) notes using a standardised form.

The pre-intervention results were presented to the stakeholders including hospital leaders and management.

A multidisciplinary Quality Improvement Team (QIT) was formed. Members: Orthopaedic surgeons, ICP, ward and OT nurses, Anaesthetist, Pharmacist and the Quality and Medical Development (QMD) personnel. Roles and responsibilities of each member was clearly identified.

2

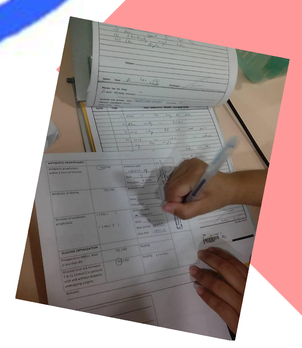
A standardised SSI bundle checklist was developed by the QIT and implemented.

SSI bundle components were: (i) Pre-operative bathing, (ii) surgical skin preparation (contact time and type of skin prep), (iii) hair clipping when indicated, (iv) surgical antibiotic prophylaxis (SAP) within 60 minutes prior incision , (v) SAP re-dosing when indicated.

The QIT had regular meetings (fortnightly then monthly) to review the progress, identify and solve problems

Immediate problems related to SSI bundle were communicated through a WhatsApp group

Post-operatively, patients were followed up for the 90 days to monitor development of SSI.



3

The post-intervention data were compiled and analysed by the ICP. Comparison between the pre-intervention and post-intervention data was analysed by using Microsoft Excel 2016 version.

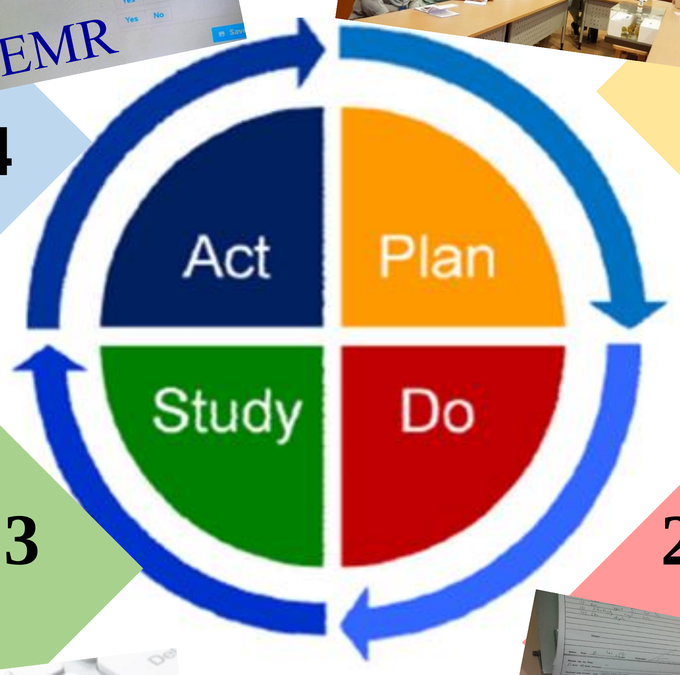
This data was presented to the QIT and other stakeholders in management meetings such as the Medical Advisory Committee meeting.

4

Implementation of the checklist for all ORIF surgeries in trauma team 1&2 since mid February 2019.

Discussions with Information Technology Department, QMD and OT subcommittee to include the SSI prevention bundle on EMR to roll out to the whole hospital

Period gap analysis using the *ASSAT* and ongoing PDSA cycles to improve practice.



Results

A total of 73 cases were reviewed (pre-intervention=23 cases; post-intervention=50 cases).

The incidence of SSI reduced from 8 per 100 procedures during pre-intervention to 4 per 100 procedures during post-intervention period.

The compliance to the components in the SSI bundle had increased in the post-intervention period compared to the pre-intervention period.(Figure 1) .

Figure 1: Pre- and post-intervention compliance rate to the components in the SSI bundle

	Pre-intervention (n=23)	Post-intervention (n=50)
SSI rate	8 per 100 procedures	4 per 100 procedures
Documentation	n (%)	n (%)
Pre-operative bathing	17 (74%)	50 (100)
Surgical skin preparation (contact time and type of skin prep)	0	48 (96)
Hair clipping	2 (9%)	50 (100)
SAP within 60 minutes before incision	20 (83%)	50 (100)
SAP Re-dosing appropriately	23 (100%)	50 (100)

Discussion

Prior to implementation of any intervention, a gap analysis using tools such as the *ASSAT* is essential to identify gaps between evidence and current practice.

Implementation of a multimodal SSI prevention strategy has shown to be feasible in low-resource settings and can improve preventive measures and reduce SSI risk [3]

Conclusion

Using a SSI bundle checklist developed by a multidisciplinary team, regular meetings, better communication and team work, improved compliance to the components in the SSI bundle and reduced the rates of SSI in ORIF of closed LL fractures in UMMC.

The bundle consists of a set of key evidence-based interventions that are not expensive and is general to all surgeries. Therefore, to standardize practice and improve patient care, this SSI bundle checklist will be introduced in other surgical procedures gradually and subsequently implemented hospital wide via the EMR system.

Acknowledgement

The top management of UMMC for supporting this initiative and the OT 5 staff.

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