Controlling a rising trend of Surgical Site Infection (SSI) at a large tertiary care Hospital by utilizing "Plan DO Study Act" (PDSA) as a quality improvement tool

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ABSTRACT

Surgical Site Infection (SSI)remains a common and widespread problem, which contributes to significant morbidity and mortality, prolongs hospital stays, and consequently increases healthcare costs. The current study was aimed to assess the cause of sudden hike in SSI among patients in a tertiary care Hospital at Kolkata, India and implementation of strategic actions to control the infection rate. An increase in SSI cases was reported by the Infection Control (IC) team in 2nd week of June 2023, through the weekly dashboard. It was later presented that the number of SSIs has been steadily increasing from the month of April.

All pre-operative, intraoperative, and post-operative environmental and patient factors were audited. Deficiencies were found in hand washing time, pre-surgical antibiotic and incision interval, OT cleaning duration, and instrument cleaning process. The findings were disseminated widely among different key stakeholders Recommended corrective and preventive actions were implemented which depicted a decrease in rate of SSI's from July 2023.

INTRODUCTION

An increase in Surgical Site Infection cases was reported by the Infection Control team in 2nd week of June 2023 at a large tertiary care hospital. It was observed that the number of SSIs were steadily increasing after the month of April. The total number of SSI detected was 9, 13 & 20 in April, May, and June respectively.

Hence an epidemiological study with quality improvement PDSA tool was conducted to investigate, identify the key causes and take necessary measures to reduce the instances of SSI.

Objectives of study

Undertake an epidemiological study to identify the underlying cause in the increase in SSI

Study the present problem and process

Investigate the source of causes

Identify possible gaps and opportunities for improvement

Take corrective and preventive measures to minimize the instances of SSI

METHODOLOGY

Step 1. — **Plan**

An epidemiological study was designed. Fish bone analysis was done and an ICN was posted inside OT to observe process and collect data.

Step 2. — **Do**

Pre-operative, intraoperative, post-operative environmental and patient factors were audited. Microbiological surveillance culture was done of OT, sterile instruments, hand swabs and air settle plates

Step 3. — **Study**

Qualitative and quantitative data was analyzed, discussed in HIC committee to identify gaps and implement corrective & preventive actions

Step 4. — **Act**

Implementation of recommended interventions

RESULTS

In month of May, June the SSI rate were 1.2 & 2 per 1000 surgeries respectively. While the benchmark adopted was 1 SSI per 1000 surgeries.

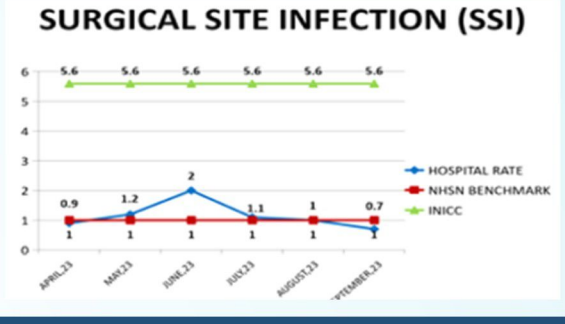
The key findings of the Epidiolomological study indicated

- ***SSI happened either in OT 8*** (45%, n=27) ***or Oncolo OT 4*** (60%, n=15) ***which had high throughput of surgeries***
- ***None of the surveillance samples or rinse water revealed any growth.***
- ***Increasing trend of SSI in GI surgeries*** (30%, n=42) and Onco Head & Neck surgeries (21%, n=42).
- ***SSI occurred mostly in clean contaminated surgeries*** (64%, n=42).
- ***Incidence of deep incisional SSI were more*** in oncology OT (40%, n=15) and superficial incisional SSI more in no-oncology OT (51.8%, n=27).
- ***Klebsiella pneumoniae*** was the commonest organism causing SSI (54%, n=37).
- A significant number of patients who underwent ***laparoscopic surgeries were detected with SSI.***
- ***Deviations found in duration of hand washing***, less than 3 min (26.5%, n=49), less than 30 min interval between prophylactic antibiotic and skin incision (70.8%, n= 24),
- ***Relative humidity more than 60% was observed*** (80%) inside operating room

The audit findings were disseminated widely among different stakeholders and remedial actions were undertaken which included the following

- Installation of automated soap dispensers at OT scrubbing area.
- Installation of digital clock in front of hand washing basins to help HCWs wash their hands for 3 mins.
- Full body cleaning with CHG wipes for patients admitted on the day of surgery.
- Empowering OT nurses to administer the prophylactic antibiotic at recovery room
- Replacing QATS with H2O2 for OT cleaning, to reduce the effective contact time required.
- Reducing the shelf life of HLD from 14 days to 7 days.

After implementing all recommended corrective actions, the SSI rate was 1.1,1 and 0.7 in July, August and September respectively.



CONCLUSION

The changes implemented as a result of this study have enabled better control of surgical site infections, ensure safety of patients and have minimized disruption to routine activity. When outbreaks do occur, they are now controlled much more promptly. We have changed our approach in Infection Prevention and Control (IPAC) from a rules-based approach to one that is risk-based, focusing attention on identifying and managing high-risk situations