Guide

AUDITING SURGICAL ANTIBIOTIC PROPHYLAXIS

Background

The benefit of preoperative antibiotic prophylaxis for preventing the occurrence of surgical site infections (SSI) prior to non-clean and implant surgery has long been recognised.

Recommendations on the optimal choice of agent, time of administration with respect to incision and duration of surgical antibiotic prophylaxis (SAP) has been specified in clinical practice guidelines issued by professional societies and national authorities such as:

- Society for Healthcare Epidemiology of America/Infectious Diseases Society of America/American Society of Health Care Pharmacists
- National Institute for Health Care Excellence
- The Royal College of Physicians of Ireland
- Scottish Intercollegiate Guidelines Network; and
- World Health Organisation.

Despite this, surveys on SAP show that evidence-based best practice is not always adhered to.[1]

Why audit surgical antibiotic prophylaxis?

Monitoring the appropriateness of prescriptions for SAP is essential to determine if prescribing aligns with best practice. Auditing is a valuable starting point to provide baseline information, identifying where changes need to be made for improvement. Establishing measures to capture during auditing can be used to monitor the success of changes made.

Process measures

Process measures describe whether steps in the system are performing as planned. Examples include:

- Proportion of patients for whom surgical prophylactic antibiotics were prescribed in accordance with guidelines (guideline concordant with respect to choice of agent, dosage and route of administration)
- Proportion of patients who are administered indicated prophylactic antibiotics within the recommended time frame (e.g. within 60 minutes of surgical incision)
- Proportion of patients whose prophylactic antibiotics were discontinued within 24 hours after surgery (excluding procedures requiring longer courses of prophylaxis)
- Proportion of patients who received prophylaxis for an operation not included in guidelines but had a clinical justification for prophylaxis recorded in the case notes.

Outcome measures

Outcome measures are measures of the performance of the system you are seeking to improve, and relate directly to the aim. Outcome measures may describe how the system impacts the health and wellbeing of patients. Examples include:

- For a project that aims to reduce the risk of SSI:
  - Number of SSIs occurring postoperatively divided by the total number of operative procedures each month
  - Rate of SSIs occurring postoperatively in patients who receive guideline-concordant prophylaxis compared with rate of SSIs in patients who receive guideline-discordant prophylaxis, expressed as a ratio
- For a project that aims to reduce *Clostridium difficile* infections (CDI):
  - Rate of CDI occurring postoperatively in patients who receive guideline-concordant prophylaxis compared with rate of CDI in patients who receive

guideline-discordant prophylaxis, expressed as a ratio.

- For a project that aims to optimise use of SAP:
  - Percentage of patients that receive appropriate SAP (right antibiotic, right time, right dose, right frequency and duration) each week/ fortnight/ month.

This information on SSI and CDI rates can be obtained from the surgical department or infection prevention and control unit in your facility.

Timely and targeted feedback of outcome measures to surgeons and anaesthetists may be more persuasive and successful in influencing change in SAP prescribing practice than process measures alone.

Balancing measures

These describe whether improvements in one part of the system are made at the expense of other processes in other parts of the system. They are sometimes called 'unintended consequences'. Examples include:

- SSI rate (in the absence of other changes to practices)
- Delays to surgery – due to increased time required to determine appropriate antibiotics
- Adverse reactions to guideline-concordant antibiotics
- Acquisition cost of antibiotics in operating theatres and/or surgical wards.

There are a multitude of factors that can influence whether a SSI occurs. As such, it can be hard to correlate cause and effect in this situation, but we would not expect SSI rates to worsen as a result of optimal SAP.

Compliance with standards

Monitoring SAP is a requirement of the National Safety and Quality Health Service (NSQHS) Standards. To demonstrate that the requirement is met, organisations can monitor their performance using the indicators for quality statement 6 and 9 of the Antimicrobial Stewardship Clinical Care Standard. If SAP is determined to be an area requiring focus and improvement in a Health Service Organisation, evidence of action taken in response to issues identified from monitoring must be demonstrated.

How should auditing be done?

Methodology

SAP audits can be performed prospectively or retrospectively. If capturing outcome measures such as 30 day outcomes, retrospective auditing is recommended as you could collect all the required data in one sitting (providing record review is performed at least 30 days after the procedure).

Timing

Whilst auditing SAP can be done during any timeframe, consideration of your facility's surgical rosters and avoiding low surgical activity periods is recommended. Auditing can be performed weekly, monthly, quarterly or biannually, depending on resources available.

Data sources

Auditing SAP will require access to medical records including progress notes, medication charts, intra-operative medication administration records (anaesthetic chart) and microbiology reports. If antibiotics are prescribed and dispensed on discharge from the facility, pharmacy records may also need to be accessed.

Auditing team

SAP audits can be conducted by pharmacists, nurses and/or doctors. Consider anaesthetic registrars, surgical registrars, pharmacy students and medical students (looking for research projects).

Audit tools

There are ready-to-use audit tools for SAP (discussed below). Another option is to create your own data collection tool which focuses on a specific problem identified in your facility (e.g. duration of SAP or administration time of antibiotics). Locally developed tools can simplify auditing of SAP, making it more practical and sustainable. A suggested data set for auditing SAP is included in Table 1.

Audits can also be conducted on the availability of SAP guidelines in theatres or surveying staff to find out if they use the guidelines and/or know where they are located.

Table 1: Suggested data set for auditing surgical antibiotic prophylaxis

Category	Data elements
Surgery details	• Date • Operation performed • Classification of operation (clean/clean-contaminated/ contaminated/dirty) • Elective or emergency • Name/team of anaesthetist • Name/team of surgeon • Time of surgical incision • Duration of operation
Patient factors	• Patient weight • Allergies or adverse reactions to antibiotics • Colonisation with resistant organisms • Comorbidities at the time of surgery (e.g. American Society of Anaesthesiologists score)
Peri-operative antibiotic prescription details	• Time of antibiotic administration • Name of antibiotic • Dosage of antibiotic • Second dosage indicated • Second dosage given • Documentation recorded appropriately (in correct place, clarity) • Reason for prophylaxis (e.g. evidence of a high risk of SSI) if given for an operation where prophylaxis is not routinely indicated • Reason for not giving prophylaxis (e.g. procedure not in local guideline, patient on antibiotic treatment) where prophylaxis is normally given for that operation
Post-operative antibiotic prescription details	• Name of antibiotic • Dosage of antibiotic • Route of administration • Postoperative antibiotic prophylaxis indicated • Postoperative antibiotic prophylaxis given • Antibiotic prophylaxis continued for >24 hours

Common challenges of auditing

Challenges of auditing SAP include:

- Time of antibiotic administration can be difficult to discern and estimates may need to be used
- Numerous documents that need to be reviewed to obtain all the required information for the audit
- Lack of standardised documentation of antibiotics for surgical prophylaxis.

Examples of audit tools

NSW Therapeutics Advisory Group Quality Use of Medicines indicator 2.1

This tool captures the percentage of patients who received an appropriate antibiotic (as defined by choice of agent, dosing schedule and route of administration) prior to incision, correct timing of antibiotic administration, and for the correct duration. It is noted that this tool does not examine situations where antibiotics were given unnecessarily in procedures that typically do not require antibiotic prophylaxis.

Available as an Excel Spreadsheet with accompanying methodology from http://www.nswtag.org.au/qum-indicators-set-2/

Hospital or Surgical National Antimicrobial Prescribing Survey (NAPS)

Antibiotics prescribed for more than 24 hours for surgical prophylaxis is an indicator captured in Hospital NAPS and can be used to monitor SAP. However, it does not collect timing of administration with respect to incision, or re-dosing in relation to procedure duration.

Surgical NAPS (SNAPS) was specifically designed to audit surgical (and non-surgical) procedures and captures more comprehensive data on the quantity and quality of antibiotic prescribing in this setting. Both tools are available online to registered users from https://www.naps.org.au. Data can be entered into the online portal and can be bench marked against similar participating hospitals, reports can also be generated at any time.

What to do with audit results

Audit and feedback are intended to enhance professional performance and thereby improve the quality of health care and patient safety. It has shown to be effective in reducing antimicrobial use in randomised-controlled trials, making it one of the most promising antimicrobial stewardship intervention strategies.[2]

While it is helpful to audit current clinical practice, it is also important to review the local environment, considering people, systems, structures and internal and external influences. Through this process it is possible to identify potential barriers and facilitators to improvement.

Suggestions on how to best provide feedback:

- Verbal feedback in appropriate forums – e.g. Morbidity and mortality meetings, departmental meetings and Surgical Grand Rounds
- Scoreboard – Report performance in the format of a scoreboard, ranking the most guideline concordant prescribers to the least
- Audit reports distributed by the Head of Department (or someone senior and respected in the organisation) that include specific targets for improvement.

References

1. Australian Commission on Safety and Quality in Health Care (ACSQHC). AURA 2017: Second Australian report on antimicrobial use and resistance in human health. Sydney: ACSQHC, 2017
2. Taggart L, Leung E, Muller M, Matukas L, Daneman N. Differential outcome of an antimicrobial stewardship audit and feedback program in two intensive care units: A controlled interrupted time series study. BMC Infect. Dis. 2015, 15:480

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Auditing surgical antibiotic prophylaxis
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