

## Antibiotic Prophylaxis in ENT Surgery

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### Abstract

*Peri-operative antibiotics have a significant role to play in the prevention of hospital acquired infections. Poor prescribing practice can lead to the emergence of resistant organisms and antibiotic associated infections. An audit was undertaken in which the first audit cycle identified current antibiotic prescribing practice for 139 patients. 5 patients had received antibiotics when not indicated. Following this, evidence based guidelines were issued to improve and standardise prescribing throughout the department. The second audit cycle included 128 patients and identified only 1 patient receiving inappropriate antibiotics and 1 not receiving antibiotics when they were indicated. No adverse events were identified.*

### Keywords

*Audit, antibiotics, prophylaxis, hospital acquired infection.*

### Introduction

The complications associated with peri-operative infection account for significant morbidity and mortality in surgical patients leading to an increase the length of hospital admission.<sup>1</sup> Surgical site infections (SSIs) compose up to 20% of all healthcare-associated infections and at least 5% of patients undergoing surgery develop an SSI. There are also significant cost implications.<sup>2,3</sup> Healthcare costs for a patient with an SSI are, on average, approximately twice the cost for a patient without an SSI.<sup>4</sup>

Peri-operative prophylactic antibiotics are commonly used to help reduce the frequency of post-operative infections. However, the over-use of broad spectrum antibiotics is becoming well recognised and there is now a drive towards a more rational approach to antibiotic prescribing to help to reduce the production of resistant organisms.<sup>5</sup> The inappropriate prescribing of antibiotics has also been recognised as a major cause of antibiotic associated infections such as *C. difficile* colitis. On average this increases a patient's hospital stay by 3 weeks and costs £4000 -10000 per case.<sup>6</sup> Over the last ten years the Department of Health and the Health Protection Agency have developed specific measures to tackle the incidence of MRSA and *C. difficile*. This has led to a 50% reduction of the reported cases of MRSA bacteraemia and *C. difficile* infection over the last 10 years and this is due to a number of factors including improved standards of prescribing.<sup>7</sup>

The evidence behind the efficacy of antibiotic prophylaxis in surgery has been lacking up until recently and a great variation in prescribing practice has been observed. The Scottish Intercollegiate Guidelines Network (SIGN) produced guidelines regarding surgical antibiotic prophylaxis in 2008<sup>8</sup> containing advice regarding specific surgical scenarios suggesting whether antibiotics are indicated and which to consider based on the best available evidence.

With this in mind, we sought to establish what the prescribing practice for our ENT department was for all subspecialties. This formed the basis of the first cycle of an audit. The results of this were then used to highlight areas where prophylaxis was not in keeping with recognised guidelines. A specific departmental guideline for antibiotic prophylaxis was agreed and distributed throughout the unit. The second cycle of the audit was then undertaken to

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establish if the protocol had been taken into consideration and how the change in prescribing practice had affected operative complication rates.

### Materials and Methods

The first cycle of the audit involved assessing all patients undergoing elective surgery at the Queen Elizabeth Hospital, Birmingham during a 3 week period in July 2009. Prospective data was collected regarding the patients' medical problems, the operation findings and procedure, whether antibiotics were prescribed during admission (including intra-operatively) and any indications or contra-indications for prophylactic antibiotics. Information was gathered by reviewing the patient records, the electronic prescribing system and the anaesthetic charts each day. The 'Guidelines for Antibiotic Prophylaxis in ENT' were then designed by using information given in the SIGN guidelines (see attached protocol) and distributed to ENT prescribers. Data gathering for the second cycle of the audit was performed 4 weeks after the guidelines were agreed for a further 3 week period in September and October 2009.

### Results

#### First cycle

139 patients were included. After analysis it was found that 5 patients received antibiotics when none were indicated for that procedure. Inappropriate antibiotics were given for patients undergoing septorhinoplasty, trimming of turbinates, septoplasty and nasal polypectomy. These patients received 5 or 7 days of co-amoxiclav or erythromycin post-operatively. In addition, 2 patients undergoing cochlear implantation were not given doses of antibiotics when they were indicated.

#### Second cycle

This cycle included 128 patients. The majority of prescribing adhered to the guidelines that had been agreed. 1 patient who had undergone surgery for a bone anchored hearing aid, received antibiotics which were not recommended. 1 patient undergoing cochlear implantation did not receive a third dose of co-amoxiclav which was recommended.

### Discussion

This completed audit has resulted in a streamlining of prescribing practice in our unit so that the balance between post-operative infection prevention and both long term and short term complications associated with poor antibiotic prescribing has been achieved. In the past, many patients have received doses of antibiotics inappropriately. There are a number of reasons for this. There is a lack of strong evidence that post-operative antibiotics reduce post-operative infection rates for many of the common ENT procedures. However, the paucity of evidence for the contrary has led to antibiotics being prescribed as the consequences of wound infections are

notoriously difficult to treat. As the evidence for their use and more importantly, their non-use is becoming more apparent, prophylactic prescribing must become more justified. This is particularly important in the current era of hospital-acquired infections. Hospital cleanliness is improving but knowledge of hospital acquired infections is varied. Aroori *et al.*<sup>9</sup> have found a significant lack of knowledge concerning *C. difficile* infection amongst healthcare professions, in particular amongst consultants and nurses. Antibiotic restriction is the single most effective measure to reduce *C. difficile* infections.

The SIGN guidelines which were reviewed as part of this audit go some way in helping surgeons to know which situations antibiotic prophylaxis is indicated. There is a growing body of evidence that a full course of oral antibiotics post-operatively is commonly not indicated. The first cycle of this audit identified that a number of individuals were practicing this and after an explanation of the current evidence, this prescribing practice has now significantly reduced. An understanding that clean and clean-contaminated surgery in ENT rarely requires antibiotic prophylaxis has now been acknowledged in this unit. This is particularly true for common middle ear and nasal procedures.<sup>8</sup>

A further reason for poor prescribing practice is not only lack of current knowledge but resistance to change itself. Cabana *et al.*<sup>10</sup> have demonstrated that there is a poor long term adherence to new protocols that are implemented. We plan to re-audit again to assess the longer term adherence to the guidelines. Analysis of the departmental morbidity and mortality data for three months following introduction of the guideline did not reveal any increase in post operative wound infections, hospital acquired infections or antibiotic associated infections.

Reducing hospital acquired infections including SSIs would lead to reduced costs for treating these patients. In addition, rationalised prescribing should reduce the use of more expensive broad spectrum antibiotics. The cost advantages for more strict measures to limit the spread of MRSA have been established<sup>11</sup> and we believe that the process of improving prophylactic antibiotic prescribing will go some way in benefiting the hospital financially as well as the patients undergoing surgery.

### Conclusion

A clear, evidence based antibiotic guideline has been created to help to rationalise antibiotic prescribing. A reduction in antibiotic prescribing suggested by this guideline did not cause any increase in post-operative wound infections. By prescribing fewer antibiotics, the risk of antibiotic associated problems such as *C. difficile* and resistant bacteria (e.g. MRSA) can be reduced. This may also help to achieve cost savings.

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### Key Learning Points

- Poor antibiotic prescribing practice leads to the emergence of resistant organisms and antibiotic associated infections
- Evidence is now emerging regarding the use of antibiotics for prophylaxis in ENT and evidence based guidelines now exist
- A completed audit cycle has identified highlighted poor prescribing practice and improved outcomes are now being seen

### Guidelines for Antibiotic Prophylaxis in ENT Surgery

- **Otology**
  - Grommet insertion – consider single dose of topical antibiotic drops upon insertion
  - Cochlear implantation - single dose of co-amoxiclav (1.2g IV) on anaesthetic induction, then 2 further doses within 24 hours
  - Intra-aural prostheses - no antibiotics
  - Other middle ear surgery – single dose of co-amoxiclav (1.2g IV) only justified if considered as a contaminated/dirty procedure.
  - BIPP packing as appropriate.
- **Skull Base Surgery**
  - Repair of CSF leak - single dose of co-amoxiclav (1.2g IV) on anaesthetic induction
- **Rhinology**
  - Prophylaxis only justified if rhinoplasty is used in reconstructive surgery
- **Head and neck surgery**
  - Benign surgery – clean; no antibiotics
  - Benign surgery – contaminated (eg. by saliva); single dose of co-amoxiclav (1.2g IV)
  - Neck dissection (malignant) - single dose of co-amoxiclav (1.2g IV)
  - Open viscus surgery - single dose of co-amoxiclav (1.2g IV) on anaesthetic induction

### Notes

These guidelines are based on the Scottish Intercollegiate Guidelines Network national clinical guideline published July 2008 and are based on the best current evidence available.

- Intravenous antibiotics should be given  $\leq 30$  minutes before the skin is incised
- If the procedure lasts  $>4$ hrs and prophylaxis is indicated, a second dose should be considered intra-operatively
- Patients colonised with MRSA should have a course of intranasal mupirocin prior to high risk surgery
- Patients undergoing high risk surgery who are MRSA positive or penicillin allergic should receive teicoplanin 600mg IV if patient  $<70$ kg or 800mg if  $>70$ kg plus gentamycin 120mg IV

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