



Original research

Antibiotic prophylaxis audit and questionnaire study: Traffic Light Poster improves adherence to protocol in gastrointestinal surgery



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HIGHLIGHTS

- Closed loop audit and questionnaire survey of antibiotic prophylaxis in gastrointestinal surgery.
- Poor compliance to hospital antibiotic prophylactic protocols due to lack of awareness.
- In clean wounds, 30% would not give antibiotics as recommended and 45% would use appropriate antibiotics in clean contaminated wounds.
- Traffic Light Poster, an educational intervention improved adherence to hospital protocol.

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ABSTRACT

Objective: To measure adherence to antibiotic prophylaxis (AP) protocol amongst surgeons and anaesthetists and explore their understanding of AP prescribing in practice.

Design: A prospective audit of AP in gastrointestinal surgery and re-audit after intervention. A questionnaire survey of practice.

Results: 58 (38%- clean; 62%- clean contaminated) operations were audited and 73 (48%-clean; 51%-clean contaminated) operations were re-audited after intervention with "Traffic Light Poster" (TFP). 55 colleagues (32 consultants and 23 trainees) were recruited for questionnaire survey in three West Midlands hospitals.

Audit and Re-Audits. Only 31% of procedures followed the protocol correctly in the initial audit and this increased to 73% in the re-audit. 73% of patients undergoing clean procedures received AP inappropriately in the initial audit but reduced significantly to 20% ($p < 0.002$) in the re-audit. In the initial audit, 62% of clean contaminated procedures did not receive the appropriate first line AP but this fell to 35% ($p < 0.05$) in the re-audit.

Questionnaire Survey- Only 30% of respondents would not give AP in clean surgery as recommended. 45% would use appropriate AP for clean-contaminated wounds. 73% of respondents will give AP at induction, 20% 1 h pre op and 7% just before incision.

Conclusion: There is poor compliance with AP protocols in gastrointestinal surgery in part due to general lack of awareness. An educational intervention in the form of a 'Traffic Light Poster' improved adherence to AP protocol two fold. There was improved rationalizing of AP. Clean procedures, in particular, had less inappropriate prescribing.

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1. Introduction

Antibiotic prophylaxis (AP) is an important measure used to decrease surgical site infections (SSI) incidence and it reduces

contaminated inoculations perioperatively [1–5]. SSIs are common cause of hospital acquired infections [6,7] and appropriate AP can reduce the incidence fourfold [8] without increasing the incidence of *C. Diff* colitis [9,10]. Scottish Intercollegiate Guidelines Network (SIGN) have designed evidence-based guidelines, which advocate the rationalization of AP [11] and the National Institute for Clinical Excellence (NICE) also produced a similar AP guideline [12]. Despite

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published evidence for AP, there is low adherence to hospital AP protocols [13–16].

There are multiple reasons for low adherence to hospital protocols and lack of awareness is a common one [14–17]. Cabana et al. (1999) [18] identified 4 main reasons for poor compliance with: lack of awareness of the evidence for the suggested guidelines, lack of familiarity, lack of agreement with guidelines and inertia of previous practice which means there is resistance to change.

Eskicioglu et al. (2012) explains that broad reaching initiatives are key to narrowing the gap between evidence and practice [12]. Effective dissemination of AP guidelines is necessary in order to improve adherence. Prado et al. (2002) implemented a prophylaxis guideline as well as an educational intervention and measured an improvement in adherence from 56.4% to 100% [19]. Imai-Kamata and Fushimi (2011) also advocated the use of education which improved previous suboptimal AP prescribing specifically in terms of drug selection [17].

Alexiou et al. (2010) surveyed AP usage and found that strategies can differ significantly not just locally but internationally and suggested that uniform practice based on evidence is needed to improve the general adherence to protocols [20]. However, this is difficult especially when surgeons are accustomed to following their own protocol, which has always ‘worked’ for them [14,21]. Pontenza et al. (2009) observed that surgeons’ resistance to change is often due to misunderstandings of the planning process involved [16].

This paper assesses the adherence to AP protocol with the following aims:

- 1) To audit the adherence to AP protocols in a tertiary hospital in West Midlands, UK
- 2) A cross-sectional survey of surgical and anaesthetic teams in three West Midlands Hospitals in order to assess their understanding of AP.
- 3) To re-audit adherence to AP protocols after the introduction of an educational ‘Traffic Light’ poster.

2. Methods

2.1. Design

AP use was audited for 21 days between October 2011–January 2012. Questionnaires were randomly distributed concurrently during initial audit. An intervention in the form of a ‘Traffic Light’ poster was displayed in seven theatres thereafter. A re-audit commenced after intervention in May 2012 for 28 days. Differences in frequency were compared using chi-square with Fisher’s exact test with a two-tailed *p* value.

2.2. Participants

Three West Midlands Hospitals were included in the study population. Consultant general surgeons and anaesthetists and their trainees were randomly selected for questionnaire. All protocols across the three hospitals were based on SIGN guidelines [11]. Both audits were undertaken in one large teaching hospital.

2.3. Data collection

2.3.1. Audit

Antibiotic prescribed and time administered was recorded. Penicillin allergy status, MRSA status and duration of surgery were recorded. Data was cross-referenced with anaesthetic charts and hospital electronic records.

2.3.2. Questionnaire

The questionnaire survey comprised of 10 questions, which included multiple choice and free text questions (See Appendix 1, web only). Responses were analysed using Microsoft Excel software programme.

3. Intervention

The data on AP administration obtained from the initial audit was presented at a surgical Mortality and Morbidity Meeting. A ‘Traffic Light’ Poster (See Appendix 2, web only) was produced and approved by the Microbiology Department. Data of the re-audited AP prescribing analysed and efficacy of the poster intervention was presented.

4. Results

4.1. Audit

38% (22/58) of the procedures were clean and 62% (36/58) were clean-contaminated. Inguinal hernia repair was the most common clean procedure and bowel resection was the most common clean contaminated procedure.

In the initial audit, the hospital protocol for AP was followed for 31% (18/58) of patients. Table 1. Displays the adherence to AP protocol for clean and clean contaminated surgeries.

3 different AP regimens were used in the clean procedure. The most frequently prescribed antibiotic was co-amoxiclav. In the clean-contaminated procedures, 9 different AP regimens were used as an alternative to the recommended antibiotics. The most frequently prescribed alternative antibiotic combination was co-amoxiclav and metronidazole. 4 (12.5%) patients who underwent clean-contaminated procedures did not receive antibiotics.

4.2. Re-audit

48% (35/73) of the procedures were clean and 51% (37/73) were clean contaminated (See Table 1). The hospital protocol for AP was followed 73% of cases. Inguinal hernia repair was the most common clean procedure and co-amoxiclav was the most common AP choice. Bowel resection was the most common clean contaminated procedure and co-amoxiclav and metronidazole was the most common alternative AP for this procedure. There were 8 different AP regimens used as an alternative to the recommended antibiotics. 2 (5.4%) patients who underwent clean-contaminated procedures did not receive AP. Most patients received antibiotics at induction (51%), contrary to guidelines, with the remaining patients mostly receiving AP just before first incision (40%) and 4% receiving AP 1 h pre op.

5. Questionnaire survey

In the three hospitals, 32 consultants and 23 trainees in surgery and anaesthetics completed the AP questionnaire. Their responses are seen below:

The questionnaire survey mirrored the clinical practice observed in the initial audit (Table 2). Most responders would give antibiotic prophylaxis at induction (73%) but 20% would give AP at 1-h pre op and 7% would give AP just before incision. When asked to provide specific circumstances warranting postoperative antibiotic prophylaxis, 5% stated that they were unsure of indication and 67% of responders gave appropriate situations (high infection risk in faecal contamination and specific co-morbidities like infective endocarditis), which would indicate postoperative antibiotics.

Antibiotic choice for specific procedures revealed a variety of

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