AUDIT

Role of microbiological investigations in the management of non-perineal cutaneous abscesses

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Background: Pus samples for microbiological examination are routinely sent after incision and drainage of abscesses. There is no evidence that microbiology reports influence treatment for non-perineal cutaneous abscesses.

Aims: This study assessed (1) how often the microbiology report is used to manage patients' treatment after incision and drainage of an abscess and (2) junior surgical trainees' opinions on sending pus for microbiological examination.

Method: A retrospective analysis of the notes of all patients undergoing incision and drainage of abscesses from January 2001 to January 2002 was made. A telephone poll of junior surgical trainees was also undertaken.

Results: Most patients, 91%, had specimens referred for microbiology. Of these 43% yielded no growth. *Staphylococcus aureus* was the most common organism (55.9% of all positive cultures). Anaerobes were a frequent finding from axilla and groin abscesses. *Mycobacterium tuberculosis* was grown in two patients. Other less common organisms cultured were methicillin resistant *S aureus* (n=1) and *Proteus* sp (n=1). Follow up of microbiology reports was found to be inadequate.

Conclusion: The bacteria present in non-perineal cutaneous abscesses are, for the most part, predictable. However, a significant number grow less common organisms. It is concluded that pus specimens should be sent routinely for culture and sensitivity and there should be further emphasis on following up microbiology reports by junior medical staff.

An abscess is a discrete or localised collection of pus.¹ Incision and drainage of abscesses is probably the most common emergency procedure performed in general surgery. The management of superficial abscesses involves an ellipse or cruciate incision followed by curettage, washout, and packing with a suitable material, such as ribbon gauze or Kaltostat without antibiotics, under a general or local anaesthetic.^{2–4} The sending of pus is routinely performed during these procedures for culture and sensitivity. Previous studies have shown that the microbiology from the pus drained in perianal abscesses holds considerable prognostic value in determining which abscesses are associated with fistulae formation.^{3–7} However, there are no data to suggest that pus microbiology from non-perineal abscesses will significantly alter treatment. This study attempted to determine whether the sending of pus from non-perineal abscesses held any clinical merit.

PATIENTS AND METHODS

The case notes of all adult patients who underwent incision and drainage of non-perineal subcutaneous abscesses from April 2001 to April 2002 were identified using computerised theatre records. The data collected included age, gender, date of abscess drainage, which antibiotics were prescribed before or after drainage, whether or not pus was sent for microbiological examination, and the subsequent report.

All patients had presented to a general surgical specialty after referral by their general practitioner or by their duty doctor. Patients who had cutaneous pointing of deep abdominal cavity collections and postoperative wound abscesses were excluded from the study. Patients with perineal abscess, such as pilonidal or perianal abscesses, were also excluded. Patients excluded from the study for the reasons mentioned above totalled 64. Buttock abscesses were included provided they lay in the upper outer quadrant away from the midline or

perineum. All patients had their abscesses drained under a general anaesthetic with a cruciate or ellipse incision over the point of maximum fluctuance. The pus was drained and the cavity packed with Kaltostat (Convatech, New Jersey, USA) or iodine soaked ribbon gauze.

The attitudes of surgical trainees, within the three local hospitals, were also polled via a telephone questionnaire. Specific questions were asked regarding how often pus was sent for microbiological examination, how often the reports were reviewed, and whether any of the trainees started their patients on antibiotics after drainage of the abscess. Emphasis was given during each interview that the questions related to the routine sending of pus swabs and use of postoperative antibiotics—that is, whether their practice applied to all patients, regardless of clinical presentation.

RESULTS

Sixty eight patients were identified from medical records over the 12 month period. One patient had presented with a lumbar abscess that was discovered to be connected to a renal collection and one patient had been miscoded by medical records and operative records revealed he had, in fact, a pilonidal abscess. Both these individuals were excluded from the study, leaving a total of 66 patients, 39 males and 27 females. The mean age was 50.3 years with a range of 17–90 years of age. Thirty percent of the admissions were diabetic (10% insulin controlled and 20% tablet controlled). Figure 1 summarises the anatomical distribution of the abscesses. The back, axillae, and groin were the commonest sites of presentation. Over half the patients admitted (56%) had been started on antibiotics by their general practitioner before admission. Over a third of those on antibiotics were on two or more antibiotics. Where two or more antibiotics had been prescribed, the commonest combinations were two agents with Gram positive cover, such as flucloxacillin and penicillin, rather than Gram positive/Gram

Figure 1 Anatomical distribution and frequency of abscesses incised and drained over a 12 month period (total number of patients who underwent incision and drainage = 66).

negative or aerobic/anaerobic combinations. The commonest antibiotic prescribed was flucloxacillin. The vast majority of abscesses were drained by the senior house officer (92.4%) with 65% of cases being drained “out of hours”.

In six cases pus was not sent during incision and drainage. Of the remaining 60 patients 26 (43%) showed no growth. These cases were all patients who had received preoperative antibiotics and 85% of this group comprised patients who had pus swabs sent rather than aspirated pus samples sent. The commonest organism cultured was methicillin sensitive *Staphylococcus aureus* (55.9% of all positive cultures). The second most common organisms were anaerobes (17.7%) and *Streptococcus* sp (17.7%). Two patients had *Mycobacterium tuberculosis* cultured from their abscesses. One patient had methicillin resistant *S aureus* cultured from their pus. All other organisms cultured showed expected sensitivity to appropriate antibiotics such as flucloxacillin, erythromycin, or amoxicillin (table 1). All anaerobe bacteria were sensitive to metronidazole. Twenty two patients received antibiotics after the abscess drainage. There was no relationship between patients receiving postoperative antibiotics with those receiving preoperative antibiotics and clinical details justifying antibiotic treatment were lacking in the notes (table 2).

Table 2 also shows the antibiotics used postoperatively frequently did not match the subsequent culture and sensitivity reports from the pus specimens. A total of 28 junior surgical trainees, currently working at the three local hospitals, were polled regarding their practice in the management of abscesses. The majority were senior house officers (67.9%) and the remainder were registrars (10.7%) and research fellows (21.4%). Experience in surgery ranged from 1–8 years with a mean of 2.7 years. Figure 2 summarises the results of the tele-

Table 2 Frequency of patients receiving postoperative antibiotics. The third column shows if the postoperative antibiotic matched the subsequent sensitivity of the cultured organism (when available)

Antibiotic	% Of individuals	% Of those on an antibiotic which matched sensitivity of the pus microbiology
No antibiotic	65.2	–
Antibiotics in 34.8% of patients (% of 22)		
Tuberculosis eradication	9.0	100
Penicillin	31.8	4.2
Flucloxacillin	63.6	42.5
Metronidazole	9.0	0

phone poll. The majority of surgical trainees stated that they always or most times sent pus specimens during incision and drainage of abscesses. The majority of surgical trainees also admitted that they rarely search for the results (85.7%) when dictating the patient’s discharge. A discrepancy was found to exist between the number of surgical trainees who replied that they did not routinely start postoperative antibiotics (85.7%) and high number of patients who were found to be on antibiotics during the retrospective case note analysis. In summary, it seems that although pus is routinely sent for culture during the majority of incision and drainage procedures, the report is often not looked at.

DISCUSSION

The results obtained show that *S aureus* is the commonest bacterial species associated with cutaneous abscesses. Anaerobic bacilli and *Streptococcus milleri* are important secondary causes of infection in the axillae and groin. All these organisms showed predictable sensitivity to standard antibiotics such as flucloxacillin for staphylococci and metronidazole for anaerobes. These finding are supported by other studies which identified *S aureus* as being the major organism in cutaneous abscesses⁹ with anaerobes such as *Bacteroides fragilis* being found in the perineal area.^{3 10} A significant number of patients had been started prescribed postoperative antibiotics. Incision and drainage of abscesses is usually adequate treatment and the high number of patients on antibiotics after drainage antibiotics seems inappropriate. This seems particularly true when noting that many of the postoperative antibiotics did not match the sensitivity of the subsequent culture report, the exception being tuberculosis eradication treatment and flucloxacillin. Unfortunately, due to poor medical note keeping the reason for starting postoperative antibiotics could not be assessed.

The majority of patients had pus sent for microbiological examination during incision and drainage of their abscess and

Table 1 Organisms grown from pus sent during incision and drainage of abscesses

Organism cultured	No (%)	Sensitivity	Comments
No growth	43	–	All from patients on preoperative antibiotics
Positive culture (total of 28 patients)			
<i>Staphylococcus aureus</i>	55.9	Flucloxacillin, erythromycin, Augmentin	No resistant strains cultured
<i>Streptococcus</i>			
β-Haemolytic streptococcus	5.9	Erythromycin, penicillin, amoxycillin	–
<i>Streptococcus milleri</i>	11.8	Erythromycin, penicillin, amoxycillin	Only grown from axilla and groin abscesses
Anaerobes	17.7	Metronidazole	Only grown from axilla and groin abscesses
<i>Mycobacterium tuberculosis</i>	5.9	Ethambutol, isoniazid, pyrazinamide, rifampicin	Strong clinical features of tuberculous abscess before drainage
MRSA	2.9	Erythromycin, gentamicin, mupirocin, trimethoprim, vancomycin	Previously known MRSA
<i>Proteus</i>	2.9	Augmentin	–

MRSA, methicillin resistant *Staphylococcus aureus*.

Figure 2 Surgical trainee responses to telephone questionnaire regarding their policy in the incision and drainage (I&D) of abscesses.

this was supported by the questionnaire completed by junior surgical trainees. The sending of pus for microbiology was not governed by clinical findings and appeared to be a routine procedure. A disconcerting number of trainees admitted that they rarely looked at the swab culture report and furthermore very few could remember instances where the microbiology report resulted in a change in the management of the patient. The high incidence of pus swab specimens in the group where no flora was grown on culture, highlights the need to send pus aspirates, when available, in order to increase the sensitivity of the test.

Although most surgical trainees replied that they did not routinely start their patients on postoperative antibiotics, we found from the medical records that 34.8% of patients were on antibiotics at the time of discharge. This discrepancy could be explained by the fact that the trainees polled in our questionnaire were from three different hospital sites and not all of them had operated on the patients whose medical records were reviewed. Another explanation could be that house officers managing the patients postoperatively were starting the antibiotics or continuing the antibiotics which the patients had been taking at the time of admission. This overuse of antibiotics would appear to be an issue that needs to be addressed by proper education of all members of the surgical team regarding the role of antibiotics in surgery.

Previous studies investigating the microbiological flora of abscesses in the perineal region have shown that patients with gut-derived organisms are more likely to develop fistulas secondary to incision and drainage.³⁻⁷ We believe that routine swabbing for non-perineal abscesses should also be employed because atypical organisms are grown in some individuals which would not be expected from their clinical history. Furthermore, it is recognised that cutaneous abscesses can be a marker of neutrophil/leucocyte chemotaxis or adhesion defects and it would therefore be appropriate to send pus specimens because drainage alone may be inadequate in such cases.

We would recommend avoiding the use of postoperative antibiotics unless inadequate drainage of the abscess has occurred or tuberculosis is suspected. If postoperative antibi-

otics are to be used flucoxacillin alone would be appropriate with the addition of metronidazole if a groin or axilla abscess has been incised and drained. Like any other routine investigation performed in clinical surgery, sending pus for microbiology frequently yields predictable results. However, this practice is justified by the small but important number of individuals in which microbiology after incision and drainage of abscesses reveals atypical microbiological flora. While an encouraging number of junior surgical staff are sending pus for culture for sensitivity after incision and drainage of cutaneous abscesses, more attention needs to be paid to the results of these investigations by junior surgical staff.

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