



The surgical management of cutaneous abscesses: A UK cross-sectional survey

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ARTICLE INFO

Keywords:

Cutaneous abscess
Antibiotics
Packing
'Incision and drainage'
Local anaesthetic

ABSTRACT

Aim: Cutaneous abscesses are one of the most common acute general surgery presentations. This study aimed to understand the current practice in the management of cutaneous abscesses in the United Kingdom (UK), once the decision has been made that acute surgical incision and drainage (I&D) is required.

Method: General surgeons from across the UK were surveyed on their opinions on the optimum management of cutaneous abscesses. Outcomes measured included anaesthesia, incision technique, antibiotic administration, departmental abscess pathways, and post-drainage management. A combination of Likert scales, multiple-choice questions, and short answer questions were used. Comparisons were made of Likert scales between regions using a two-sample independent *t*-test. The survey was peer reviewed and distributed through the Association of Coloproctology of Great Britain and Ireland (ACPGBI) network between April and June 2018.

Results: Sixty-one responses were collected from surgeons throughout the UK. Of these respondents, 69% indicated that cutaneous abscesses would always or usually require a General Anaesthetic (GA) for treatment, and 82% indicated that abscesses were at least sometimes not treated until the next day due to a lack of resources. While 79% of surgeons stated that pus swabs are always or are usually taken, 44% of respondents never or rarely chased the results. The main indications for giving antibiotics were sepsis/systemically unwell patients, and cellulitis. 31% of responding centres had an abscess management protocol, and 82% of respondents confirmed that they would always pack the abscess wound post-operatively.

Conclusion: 'Incision and drainage' is currently the most widely used technique for the surgical management of cutaneous abscess. However, this study demonstrates the significant variability in the use of anaesthesia, antibiotics, packing and the use of protocols to guide and streamline patient management.

1. Introduction

Cutaneous abscesses are common skin and soft tissue infections that result from microbial invasion of the dermis and its supporting structures, leading to the formation of a collection of pus. Typical presentation often involves a tender, fluctuant swelling with an overlying pustule and surrounding cellulitis [1,2]. These abscesses can be either polymicrobial or monomicrobial in nature. Over the last 25 years there has been an increase in the incidence of cutaneous abscesses and

Methicillin-Resistant Staphylococcus Aureus (MRSA) is now the most common cause of these abscesses in emergency departments in the United States (US) [2,3]. Within the United Kingdom (UK), the incidence of an abscess or boil in primary care between 1995 and 2012 was 512 and 387 per 100,000 person-years in females and males respectively [4].

The diagnosis of a cutaneous abscess is often through clinical history taking and examination. In more complex cases, where the infection is deep-seated, point-of-care ultrasound and computed tomography can be a useful adjunct [5,6]. The method of incision and drainage (I&D) is the

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<https://doi.org/10.1016/j.amsu.2020.11.068>

Received 13 May 2020; Accepted 24 November 2020

Available online 27 November 2020

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treatment of choice for cutaneous abscess and supported by the Infective Disease Society of America (IDSA), the World Society of Emergency Surgery (WSES), and the Surgical Infection Society Europe (SIS-E), along with several medical textbooks [1,2,7–9]. It is also the method taught by the UK four surgical Royal Colleges in the Intercollegiate Basic Surgical Skills Course [10]. The National Institute of Health and Care Excellence (NICE) does not have specific guidance on the treatment of cutaneous abscesses, but does reference the IDSA guidelines for I&D of boils and carbuncles [11]. The surgical technique involves a small incision across the abscess, followed by drainage of pus and blunt dissection of loculations [5]. Whilst ultrasound-guided needle drainage has been used as a therapeutic option, it is not recommended due to its low drainage success rates [2].

Whilst the evidence and guidance recommending I&D for cutaneous abscesses is clear, other aspects of care such as anaesthetic use, pain management, wound packing, and antimicrobial therapy are either not discussed by current guidelines, or are based on low-quality evidence [12,13]. Survey data from the US reveals that, overall, there is significant variation in the current management of cutaneous abscesses outside of the initial I&D [12]. There is currently a lack of specific UK guidance covering the management of cutaneous abscesses. Given this lack of standardisation and the high incidence of the condition, the aim of this article is to establish the current practice in the management of cutaneous abscesses in the UK, once the decision has been made that acute surgical I&D is required.

2. Method

A 35-question survey was designed by general surgeons from the Yorkshire Surgical Research Collaborative with expertise in managing cutaneous abscesses, with the aim of eliciting practice in four areas of surgical I&D intervention: surgical practice in the acute setting; wound packing; antimicrobial usage; and management pathways. Survey questions are demonstrated in Tables 1–5. Responses were sought in either a binary (yes/no), a 5-point Likert scale (always, usually, sometimes, rarely, never), or a selection of a single/multiple option questions with an optional free text answer.

The survey was piloted at the Yorkshire Surgical Research Collaborative meeting in May 2017. Following peer review one question was changed from a Likert scale to a multiple option answer format. The survey was then uploaded to SurveyMonkey© and disseminated through the Association of Coloproctology of Great Britain and Ireland Surgeons of Great Britain & Ireland (ACPGBI) mailing list and social media between 1st April and 30th June 2018. All responses were anonymised.

A descriptive analysis was performed on the numerical data and by individual review of free text entries. A post-hoc decision was made to statistically compare the responses from the region of Yorkshire (making up the largest area of response), and all other areas (excluding those who did not state their region). Likert scale data was visually inspected to generally follow a normal distribution with sample sizes over 10, allowing comparison to be made using a parametric two-sample independent *t*-test, which has been validated for use in such circumstances [14]. All statistical tests were performed using OpenEpi, Version 3^(c). Ethical approval was not required due to the service evaluation nature of

Table 1
Respondent characteristics.

Grade	Respondents	Percentage
Consultant	33	54.10%
Trainee	26	42.62%
No response	2	3.28%
Deanery	Respondents	Percentage
Yorkshire & Humber	24	39.34%
No response	22	36.07%
Other regions	15	24.59%

the study. This study has been reported in line with the Strengthening The Reporting Of Cohort Studies in Surgery (STROCSS) criteria [15].

3. Results

3.1. Responses

The survey received a total of 61 responses, including 33 consultants and 26 surgeons in training. Of these responses, 39% worked in 'Yorkshire and the Humber', while 25% were from other regions (Table 1). Individual responses consisted of 18 general surgeons, 9 mixed colorectal and general surgeons, 3 mixed upper GI and general surgeons, 9 surgeons from other surgical specialities, and 24 who did not detail their surgical speciality.

3.2. General surgical management of cutaneous abscesses

Forty-one respondents (67%) felt that general anaesthesia (GA) was required for the treatment of a cutaneous abscess (Table 2). The most common factors influencing this decision included size (69%) and location of the abscess (70%), as well as patient choice (51%). Routine overnight admission was felt to be sometimes necessary by twenty-four respondents (39%) and usually necessary by 8 respondents (13%). Sepsis (72%), co-morbidities (predominantly diabetes – 38%), and analgesia requirements (21%) were the most frequently quoted factors supporting an inpatient stay. Fifty respondents (82%) reported that cutaneous abscesses were either usually, or sometimes, not drained on the day of presentation due to a lack of resources.

The most popular incisions were elliptical and linear, each with 28% of the cohort reporting they were used regularly; cruciate incisions were used by 7% of respondents on a regular basis. Most respondents favoured treating the abscess at its most fluctuant point (97% choosing this option always or usually), as opposed to its most dependent point (30% always or usually). No statistically significant difference was found for any Likert scale questions for the general surgical management of cutaneous abscesses between Yorkshire and the other regions (data available on request, all *p* values > 0.05).

3.3. Antibiotic management

3.3.1. Preoperative antibiotic management

Over 50% of surgeons stated that they rarely used antimicrobials at the pre-operative stage (Table 3). In cases where IV antibiotics were required, the most common indicators were sepsis (82%) and associated cellulitis (46%). 30% of responses said that oral antibiotics were never indicated pre-operatively, with a further 18% choosing to leave indications for pre-operative oral antibiotics blank. Pus swabs were routinely taken by 79% of surgeons, however 49% of respondents felt that these swabs were rarely or never clinically useful and 44% of teams rarely or never chased the results.

3.3.2. Intra-operative antibiotic management

Thirty-three respondents (54%) said they would rarely give intra-operative antibiotics. When given, 50% of respondents said that it would be because the patients were septic/systemically unwell, with 20% mentioning associated cellulitis.

3.3.3. Post-operative antibiotic management

Post-operative antibiotics were rarely given by the respondents, with 66% of respondents rarely or never giving intravenous antibiotics and 50% rarely or never giving oral antibiotics. Oral antibiotics were found to be more indicated for cellulitis (46%) compared to sepsis (26%), whereas IV antibiotics were indicated in cases of sepsis/systemically unwell patients (67%) compared to cellulitis (34%). No statistically significant difference was found for any Likert scale questions relating to the use of antibiotics in the management of cutaneous abscesses between

Table 2
Surgical management of cutaneous abscesses (total responses (percentage)).

Response	Skin and soft tissue abscesses that need drainage:							
	are treated under a general anaesthetic	require overnight admission	are not drained on the same day due to lack of resources	are incised with a linear incision?	are incised with an elliptical incision?	are incised with a cruciate incision?	are incised at their most fluctuant point?	are incised at their most dependent point?
Always	1 (1.64%)	0 (0.00%)	0 (0.00%)	3 (4.92%)	5 (8.20%)	0 (0.00%)	18 (29.51%)	5 (8.20%)
Usually	41 (67.21%)	8 (13.11%)	16 (26.23%)	17 (27.87%)	17 (27.87%)	4 (6.56%)	41 (67.21%)	13 (21.31%)
Sometimes	18 (29.51%)	24 (39.34%)	34 (55.74%)	20 (32.79%)	26 (42.62%)	23 (37.70%)	2 (3.28%)	32 (52.46%)
Rarely	1 (1.64%)	29 (47.54%)	10 (16.39%)	13 (21.31%)	12 (19.67%)	14 (22.95%)	0 (0.00%)	10 (16.39%)
Never	0 (0.00%)	0 (0.00%)	1 (1.64%)	8 (13.11%)	1 (1.64%)	20 (32.79%)	0 (0.00%)	1 (1.64%)
No response	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

Table 3
Surgical management of cutaneous abscesses (total responses (percentage)).

Response	Skin and soft tissue abscesses that need drainage - culture and antibiotic treatment:						
	Pus swabs are routinely taken?	I or another member of the team "chase" the results of the pus swab	Pus swabs are important for the treatment of soft tissue abscesses?	How often are pre-operative antibiotics administered?	How often are intra-operative antibiotics administered?	How often are post-operative IV antibiotics administered?	How often are post-operative oral antibiotics administered?
Always	23 (37.70%)	8 (13.11%)	5 (8.20%)	0 (0.00%)	5 (8.20%)	0 (0.00%)	1 (1.64%)
Usually	25 (40.98%)	13 (21.31%)	9 (14.75%)	8 (13.11%)	7 (11.48%)	3 (4.92%)	6 (9.84%)
Sometimes	3 (4.92%)	13 (21.31%)	17 (27.87%)	21 (34.43%)	14 (22.95%)	18 (29.51%)	24 (39.34%)
Rarely	9 (14.75%)	21 (34.43%)	25 (40.98%)	31 (50.82%)	33 (54.10%)	40 (65.57%)	27 (44.26%)
Never	1 (1.64%)	6 (9.84%)	5 (8.20%)	1 (1.64%)	2 (3.28%)	0 (0.00%)	3 (4.92%)
No response	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

Table 4
The top three most important influencers in your choice of packing material.

Influencers factors	Respondents	Percentage
Size of abscess cavity	18	29.51%
Availability	15	24.59%
Haemostasis	11	18.03%
No response	9	14.75%
Ease of removal	9	14.75%
Cost	4	6.56%
Would not pack the wound	3	4.92%
Soft	2	3.28%
Depth	2	3.28%
Absorbent	2	3.28%
Other	24	39.34%

Yorkshire and the other regions (data available on request, all p values > 0.05).

3.4. Wound packing

Fifty respondents (82%) confirmed that they would always pack the abscess wound post-operatively, with no significant difference found between responses from Yorkshire and the other regions (mid-P exact test, $p = 0.80$). Choice of packing material varied, with 40% of respondents referencing Aquacell® (ConvaTec, US), 21% Sorbsan® (Aspen Medical, Australia), and 23% Kaltostat® (ConvaTec, US). Highlighted reasons underlying the choice of packing material included the size of abscess (30%), availability of the material (25%), and the material's ability to achieve haemostasis (18%) (Table 4). Twenty-seven respondents (44%) said they would change this packing daily, with a further 23% saying they would change it between 24 and 48 h. Four

Table 5
Wound packing.

What % packaging is changed:	<12 Hours	12-24 Hours	24-48 Hours	>48 Hours	By an FY1	By an SHO	By a REG	By a consultant
Mean percentage (SD)	54.13 (31.20)	28.86 (25.64)	12.07 (16.98)	5.88 (13.44)	2.35 (3.73)	34.58 (25.52)	54.07 (22.71)	12.65 (18.49)

respondents (6%) said they would leave the packing greater than 48 h until it was changed. The first inpatient packing change was most likely to be undertaken by a registrar (54% of the time on average) or a Senior House Officer (35%), with Foundation Year 1 doctors being only very rarely used to change these dressings (2%) (Table 5).

3.5. Management pathways

The survey showed that 31% of the respondents worked in a department that had specific abscess protocols, and 25% had dedicated abscess lists for I&D. Twenty-six respondents (40%) were unsure if specific guidance would increase I&D under local anaesthetic, and responses were mixed on if this type of guideline was thought to save time on the emergency list (Table 6).

4. Discussion

This study provides a snapshot of current practice in managing cutaneous abscesses in secondary care in the UK. Whilst there are some areas of common practice, such as the use of post-drainage wound packing, there are many areas showing considerable variation.

4.1. Limitations

While steps have been taken to limit the impact of bias, there are some limitations to results of this survey. A high percentage of respondents were from the Yorkshire deanery, and therefore the results may be skewed towards practice in this region as opposed to the rest of the UK. Post-hoc statistical analysis did not provide any evidence of significant variations between these regions; however, such results

Table 6
Skin and soft tissue abscesses that need drainage – protocols (total responses (percentage)).

Response	Protocols:				
	Is there an abscess management protocol in your department?	If yes, does this included guidelines on which abscesses can be treated under general anaesthetic?	Do you have a dedicated list or time slot for abscess incision and drainage in your department	Do you think more abscesses would be drained under local anaesthetic if specific guidelines were available?	Do you think this would have a significant time-saving impact on the emergency list?
No	41 (67.21%)	14 (22.95%)	43 (70.49%)	25 (40.98%)	22 (36.07%)
Yes	19 (31.15%)	9 (14.75%)	15 (24.59%)	10 (16.39%)	20 (32.79%)
Maybe	0 (0.00%)	0 (0.00%)	0 (0.00%)	26 (42.62%)	17 (27.87%)
N/A	0 (0.00%)	31 (50.82%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
No response	1 (1.64%)	7 (11.48%)	3 (4.92%)	0 (0.00%)	2 (3.28%)

should be interpreted with caution due to the likely under-powered nature of the study to find such differences, and the inherent cautions involved in post-hoc statistical analysis. To reduce the impact of “false choice” and improve the quality of the overall data, all questions included a ‘not applicable’ option [16]. To prevent data degradation, information on the influencing factors on a respondent were collected as a top three with free-text responses, allowing a more detailed picture of these factors to be formed by the authors [16]. To avoid bias from formatting and unclear questions, the survey was piloted at the Yorkshire Research Collaborative meeting, which simulated the likely characteristics and background of the respondents to this survey [16]. As the survey was distributed both through a surgical institution and through social media, a decision was made not to include a denominator as it may not be accurate; this makes assessment of non-response bias problematic and is a limitation of the current study. The Yorkshire Surgical Research Collaborative is currently completing a prospective cohort study of simple subcutaneous abscesses exploring the use of anaesthetic and wound packing in cutaneous abscesses, which will add in detail to the study presented here. This survey looked primarily at the practice of general surgeons; therefore, these patients have already by-passed primary care in order to have been reviewed by a surgical team and assessed as requiring acute surgical I&D. Therefore, these results will not apply to less severe cutaneous abscesses that could be managed conservatively.

4.2. Surgical management and protocols for cutaneous abscesses

In this US and Australia, cutaneous abscesses are often managed within emergency departments or primary care offices under local anaesthesia, with GA management being only being indicated for complex cases, those with significant co-morbidity, or those who are systemically unwell [12,17–19]. This study suggests that practice in the UK deviates from our international colleagues, with a preference for abscesses requiring I&D to be done under GA. Our results show that size and location are important factors for surgeons when choosing if a cutaneous abscess should be managed through GA or local anaesthetic. Currently, there is a notable lack of national or international guidelines on criteria relating to these aspects of cutaneous abscesses in relation to their management, as well as their outcomes. Schmitz et al. has reviewed the currently available guidelines for pain management during the I&D of cutaneous abscesses, and found considerable variation over recommendations on the international stage relating to the use of local anaesthetic, regional blocks, and GAs [12]. They went on to demonstrate that most US providers in their study would most commonly perform I&D under local anaesthetic with either oral or intravenous opioids. The IDSA guidelines do not comment on the effectiveness of other pain management options in comparison to GA, but there is suggestion that local anaesthetics are less effective in acidic conditions such as infection sites [2,12]. Future studies using observational data collected from cutaneous abscess presentations, management options, and outcomes would be well places to correct this current void.

Within the UK, most patients are managed under the surgical team rather than in the emergency department or primary care [20]. This study shows that most patients were managed under GA and were sometimes required to stay overnight. A high percentage of respondents felt that abscesses would at least sometimes not have definitive surgical management on their day of presentation due to a lack of resources. Sepsis and cellulitis are known complications of cutaneous abscesses, but it is not clear if delayed treatment would necessarily lead to increasing risk of such sequelae [21]. The decision-making processes within the departments were only made through specific abscess management pathways for under a third of the respondents’ centres. There is some evidence to show that the introduction of specific pathways for cutaneous abscess management within an UK setting can reduce overnight stays and decrease fasting times for patients [20].

Given this equipoise over the use of I&D with non-GA pain management models, and the use of protocols for decision-making and streamlining of services, it would be beneficial for future trials to explore if these options and strategies should play a role more widely in the UK for cutaneous abscess management. This may have the potential to improve patient care and cost-effectiveness at a time where healthcare expenditure is under increasing pressure, particularly in acute general surgery.

4.3. Antibiotic usage

This study demonstrated that it was common practice for pus swabs to be taken following drainage. Despite this, a large percentage of respondents felt that this was not a useful practice, and the result of this test were not frequently chased. It has been shown that within the UK, 86.9% of cutaneous abscesses had only one infective pathogen involved, and overall *S. aureus* was found alone in 61.3% of cases; 17.2% of these were methicillin resistant [22]. Current IDSA advice states that pus should be cultured, but management should continue without the results unless the abscess is a recurrent one [2]. Given this current practice and guidance, the cost-effectiveness of taking a pus swab from all cutaneous abscesses should be evaluated within the UK setting.

Antibiotic use by respondents showed considerable variability, with around half of respondents stating they would only rarely use antibiotics. When given, the most common influencing factors for the respondents were septic/systemically unwell patients, or those with concurrent cellulitis. These results broadly reflect the advice given by the IDSA to not give antibiotics unless the patient is showing signs of sepsis/systemic illness, immunocompromise, co-morbidity, or extremes of age [2]. On the background of two large, recent randomised controlled trials however, a recent systematic review and meta-analysis found modest evidence of reduced pain, cure rate, and recurrence when compared to I&D alone [23,24]. The Rapid Recommendations Team at the British Medical Journal are now recommending that, on discussion with patients regarding their preference, co-treatment with antibiotics would be a recommended treatment option for cutaneous abscesses [24]. These results show that these new recommendations have not moved into current practice within the UK, and that further clarification is required on current recommendations surrounding culture and antibiotic use.

4.4. Wound packing

A clear majority of respondents use packing as a mainstay of post-surgical patient management for cutaneous abscesses, but they varied over the material used. These results are of particular importance as the IDSA guidance currently state that there is weak evidence suggesting packing may lead to increased wound pain without any increase in wound healing [2,25]. Given these guidelines, this topic would warrant further study within the UK to isolate if packing should be used for cutaneous abscesses and, if so, in what situations and using what material.

5. Conclusion

The ‘Incision and drainage’ technique is the only recommended treatment in guidelines for the surgical management of cutaneous abscess. Despite this, these results demonstrate that there remains significant variability in the patient care pathway of abscess management, including anaesthetic choice, wound packing and antibiotic usage. It demonstrates that wound packing is common practice within the UK, despite current guidelines suggesting packing may not be beneficial. We propose the need for further studies investigating the benefit of local anaesthetic management, post-drainage wound packing, and standardised patient care pathways.

Provenance and peer review

Not commissioned, Editor reviewed.

What does this paper add to the literature?

Cutaneous abscesses are a common presentation to acute surgical assessment units, with incision and drainage being widely recognised as the primary treatment method [1]. This manuscript demonstrates that there is still significant variation in practice within the management of abscesses across the UK.

Declaration of competing interest

None declared.

Acknowledgements

The authors would like to acknowledge and thank the all participants including the ACPGBI members who gave their time to complete this survey. The authors would like to recognise the contributions of the Yorkshire Surgical Research Collaborative (Now known as the White Rose Research Collaborative) and its contribution to the survey design.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.amsu.2020.11.068>.

Disclosures

This report is supported by the National Institute for Health Research (NIHR) infrastructure at Leeds Teaching Hospital Trust and The University of Leeds. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

Ethical approval

As this research work focused was classified as a service evaluation within the NHS, specific ethical approval was not required.

Research registration Unique Identifying number (UIN)

Name of the registry: Chinese Clinical Trial Registry
Unique Identifying number or registration ID: ChiCTR2000030913
Hyperlink to the registration (must be publicly accessible): <http://www.chictr.org.cn/showprojen.aspx?proj=49108>

Author contribution

Dr Owen Thomas – formal analysis, writing original draft; Dr Alistair Ramsay – data curation, writing original draft; Mrs Marina Yiasemidou – conceptualization, methodology; Dr Claire Hardie – conceptualization, methodology; Mr Daniel Ashmore – conceptualization, review and editing; Mr. Christopher Macklin – review and editing, supervision; Mr Dibyendu Bandyopadhyay; review and editing, supervision; Professor Bijendra Patel – review and editing, supervision; Mr. Joshua R Burke – conceptualization, methodology, review and editing, supervision, project administration; Professor David Jayne – review and editing, supervision.

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