

Ultrasound-guided drainage of subcutaneous abscesses on the trunk is feasible

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ABSTRACT

INTRODUCTION: Subcutaneous trunk abscesses are frequent, and current treatment options generally involve incision. By contrast, the standard care for breast abscesses is ultrasound-guided drainage. The aim of this study was to evaluate the feasibility of ultrasound-guided drainage combined with antibiotics in the treatment of subcutaneous abscesses on the trunk.

MATERIAL AND METHODS: In this prospective study, 27 patients were treated with ultrasound-guided needle aspiration and oral antibiotics. Follow-up was performed at a 3-6-day interval, and the procedure was repeated if the abscess was not obliterated.

RESULTS: Treatment was initially successful in 25 of the 27 participants (93%); two patients went on to surgery. The median time from first treatment to the final control visit was nine days. The 25 patients with initial successful treatment were contacted after a median of 84 days, and six (24%) of these reported recurrence of an abscess at the puncture site. 88% of the patients reported that they were satisfied or very satisfied with ultrasound-guided drainage.

CONCLUSION: Our results indicate that ultrasound-guided drainage combined with antibiotics is feasible in the treatment of small subcutaneous abscesses on the trunk. Ultrasound-guided drainage was well-tolerated, had a high degree of success and short healing times. Additional randomised studies are needed to verify our findings.

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Subcutaneous abscesses are frequent, and patients with abscesses are often referred to departments of surgery for acute assessment. Current treatment options include incision and open wound care, or incision, curettage and primary suture with antibiotic coverage [1, 2].

However, this therapy can be expensive because it often involves general anaesthesia and treatment in an operating theatre.

For breast abscesses, however, ultrasound-guided drainage combined with antibiotics represents standard care and is effective in 97% of cases [3]. Ultrasound-guided drainage is minimally invasive and could be beneficial in the treatment of other types of truncal abscesses.

The aim of this study was to evaluate the feasibility

of ultrasound-guided abscess drainage (UGAD) combined with antibiotics in the treatment of subcutaneous abscesses on the trunk.

MATERIAL AND METHODS

In this prospective study, 27 patients were enrolled between 20 April 2009 and 4 May 2010. Patients with clinical signs (tenderness, redness, swelling and fluctuant mass) of an uncomplicated abscess on the trunk were enrolled non-consecutively, five days a week at daytime.

Patients were excluded if they had a skin lesion (wound, vesication), an anal abscess, a pilonidal abscess, which was considered to be an infected sebaceous cyst, or were immune-suppressed.

Ultrasound-guided drainage was performed by two surgeons participating in the study (SK, BR). The initial size of the abscess was measured on the skin surface, and the largest diameter of the abscess cavity was measured with ultrasound (linear transducer, 7.5 MHz). Local infiltration anaesthesia with lidocain was then applied at the intended puncture site. Freehand ultrasound-guided aspiration was performed with an 18 G (1.2 mm) standard needle, and the abscess cavity was flushed with saline. We planned catheter drainage if the largest sonographic diameter of the abscess exceeded 3 cm, but no such cases showed (Table 1).

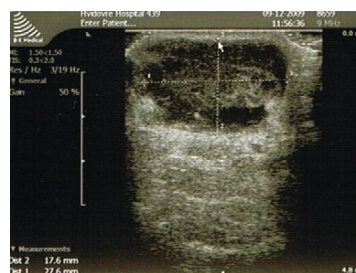
Patients received oral antibiotics for ten days following drainage; dicloxacillin 1 g and metronidazole 0.5 g three times a day or erythromycin 0.5 g and metronidazole 0.5 g three times a day if allergic to penicillin. Aspiration samples were sent for bacterial culture and sensitivity testing, and the antibiotic therapy was adjusted accordingly.

Follow-up clinical examination and ultrasound were

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Ultrasound picture of an abscess cavity.

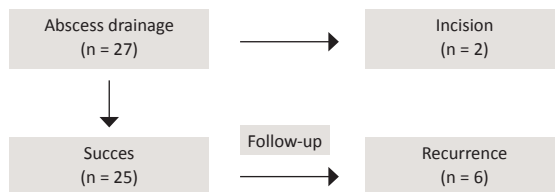
TABLE 1

Clinical characteristics of the patients.

Patients, n	27
Female	17
Male	10
Age, years, median (range)	35 (18-55)
Body mass index, kg/m ² , median (range)	25 (20-40)
Time from symptom to treatment, days, median (range)	4 (2-7)
Patients with previous abscess, n (%)	21 (78)
Localization of abscess, n	
Axilla	18
Abdomen	6
Buttocks	1
Thorax	2
Clinical size of abscess, cm, median (range)	4 (2-7)
Abscess size recorded with ultrasound, mm, median (range)	20 (10-30)

FIGURE 1

Outcome of treatment, median follow-up 84 (36-192) days.



performed at a 3-6-day interval. If the abscess was not obliterated on follow-up ultrasound examination, the procedure was repeated. Control visits were terminated after treatment success, which we defined as no clinical signs of abscess and an obliterated abscess cavity as visualised by ultrasound. If the patients did not improve after two needle aspirations, surgical drainage was planned. Recurrence of an abscess after treatment success as well as patient satisfaction were recorded at a telephone follow-up a minimum of one month after the last drainage. We rated patient satisfaction on a five-level scale (1: very satisfied, 2: satisfied, 3: neutral, 4: unsatisfied, 5: very unsatisfied) and by asking the participants if they would recommend ultrasound-guided drainage to other patients with similar symptoms as themselves.

The study was conducted in accordance with the Helsinki Declaration. The study protocol was approved by the Local Ethics Committee (H-C-2008-132) and the Danish Data Protection Agency. Written informed consent was obtained from patients prior to enrolment.

Trial registration: not relevant.

TABLE 2

Numbers of culture analyses from abscesses. Some cultures contained two types of bacteria.

<i>Staphylococcus aureus</i>	10
Anaerobic growth	4
<i>Corynebacterium</i>	5
Coagulase-negative staphylococci	5
Streptococci group G	1
No growth	1
Not available	4

RESULTS

The median age of the patients was 35 years, and 78% had previously had one or more abscesses. The median time from onset of symptoms to diagnosis and treatment was four days. Sonographically, the largest abscess cavity diameter was median 20 mm. Improvement of symptoms was reported by 24 (89%) of the patients at the first follow-up visit. Drainage and antibiotics were initially successful in 25 of the 27 patients (93%) (Figure 1), 12 had one, another 12 had two and one had three punctures with drainage to recover. Of the remaining two patients (7% failure), one went on to surgery at her own request because the abscess showed no improvement at the first follow-up visit, the other had surgery after two punctures and no improvement at the third control visit; the operation showed an infected sebaceous cyst. The median time from first treatment to the last control visit was nine days (range 3-16 days), which yielded a healing time of nine days.

The 25 patients with initial successful treatment were contacted after a median of 84 days (36-300), and of these six (24%) reported recurrence of an abscess at the puncture site, three had abscesses in the axilla, two at the abdomen and one at the buttocks.

Staphylococcus aureus was the most frequent bacteria in the cultures (Table 2); change of the antibiotic treatment was needed in one case. Self-reported scarring was a median 1 mm (range 0-3 mm), and 23 of 25 (92%) patients were satisfied or very satisfied with the cosmetic result. Regarding the overall treatment, 22 of 27 (81%) patients reported to be satisfied or very satisfied; three reported to be neutral and two were unsatisfied.

Finally, 24 of the 27 (85%) patients would recommend ultrasound-guided drainage to other patients with subcutaneous abscesses on the trunk.

DISCUSSION

Different types of minimally invasive alternatives to the traditional incision have been tested in the handling of subcutaneous abscesses, and they have been found to

be safe and effective: incision and loop drainage [4, 5] and drainage with pezzar catheter [6]. However, in a study comparing incision with ultrasound-guided needle aspiration of skin abscesses, the authors concluded that needle aspiration is an insufficient therapy for skin abscesses, as they had treatment failure in 74% of the cases allocated to this treatment [7]. The failure rate reported is very high compared with our results (7% failure). Their study was conservative which gave a limited change of treatment success: only one aspiration was performed, they did not flush the abscess to help clear it and failure was defined as the inability to fully aspirate all abscess cavity contents which resulted in 60% failure at day 0. It is therefore possible that the previous study [7] underestimated the potential of UGAD.

Our findings support the concept of UGAD in combination with oral antibiotics in subcutaneous trunkal abscesses, just as this treatment modality has generally replaced the open treatment of breast abscesses [3]. The method is technically uncomplicated, minimally invasive and entails no need for general anaesthesia, which makes it suitable for use in an outpatient setting.

The use of ultrasound in this study ensured optimal conditions for assessment, puncturing and flushing of the abscess cavity, as well as for total emptying of abscess contents. However, a study including 30 patients has shown that needle aspiration without ultrasound guidance is effective in the treatment of breast abscesses [8]. Hence, it may be that simple needle puncture and aspiration would be sufficient treatment in these small (< 3 cm) trunkal abscesses. In larger abscesses, catheter drainage is probably preferable, which is standard in the treatment of breast abscesses [3]. In a study using a pezzar catheter where the median abscess size was 4 cm, the treatment success was not significantly different from that achieved by incision and drainage treatment [6]. This supports the use of catheter drainage in larger abscesses.

In this study, none of the abscesses had a cavity smaller than 10 mm. It is therefore possible that an abscess cavity of less than 5 mm could be technically difficult to treat with UGAD and would benefit from treatment with incision instead.

A primary success rate of 93% for resolution of the abscesses without need for surgery is comparable with results for drainage of puerperal breast abscesses, where a 97% resolution rate has been documented [3].

Our finding of a recurrence rate of 24% in this study is higher than after incision and primary closure, where a recurrence rate of 11.5 % has been documented [9]. A comparison of these results is difficult to perform and the results could probably only be fully elucidated through a formal randomized trial.

We observed no tendency in the recurrence of the

origin of the abscesses, but it is possible that patients with axilla abscesses and hidradenitis would show a tendency toward recurrence, taking the chronic nature of this disease into consideration [10].

In previous studies of incision and primary suturing, it has been argued that curettage is important in order to facilitate penetration of antibiotics, and that complete closure of the cavity is essential [9, 11]. These recommendations run somewhat contrary to our results where the primary success rate of needle drainage was 93%, but our recurrence rate could be explained by the lack of curettage.

In addition, it could be argued that a higher recurrence rate is acceptable after UGAD compared to incision, curettage and primary closure, because UGAD is minimally invasive.

Regarding antibiotic treatment, we chose to continue antibiotic treatment for ten days as is done in the treatment of breast abscesses [3], instead of just performing a one-shot treatment. The reason for this was the theoretical penetration problem when not performing curettage of the abscess [9, 11].

Patient satisfaction was generally high, and the majority would recommend UGAD to other patients with similar symptoms. This indicates that UGAD was well-tolerated by the patients, 78% had previously tried other types of treatments for subcutaneous abscesses.

We observed a median healing time of nine days. This is comparable with studies reporting healing times within seven days after incision, curettage and primary suture [2, 11, 12], and our healing time compares favourably with the 25 days needed for open wound healing [2].

The nonconsecutive recruitment, the relatively small sample size and the variable length of follow-up could influence the external validity of our results. However, the microbiological spectrum in this study is comparable to that of previous studies [13].

Overall, UGAD was well tolerated and enjoyed a high degree of success with short healing times. Potentially, UGAD could be a "first-line treatment" of trunkal abscesses, reserving incision and debridement for "second-line treatment" when UGAD has failed.

In conclusion, our results indicate that ultrasound-guided drainage combined with antibiotics is feasible in the treatment of small subcutaneous abscesses on the trunk. Additional randomised studies are needed to verify our findings.

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CONFLICTS OF INTEREST: Disclosure forms provided by the authors are available with the full text of this article at www.danmedj.dk

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