

Original article

USG-Guided Percutaneous Aspiration: an Effective Way for Managing Appendicular Abscess

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Abstract

Background: During last 2–3 decades image-guided drainage procedures have been developed complementing modern surgical drainage techniques. The development of interventional radiological procedure has made percutaneous puncture and drainage of abdominal fluid collection possible. Image-guided percutaneous drainage of appendicular abscess has become well-established because of its proven safety and efficacy. **Objectives:** To evaluate the safety and feasibility of USG-guided percutaneous aspiration for draining appendicular abscess with special attention to the need for conversion and to see the nature of complications after draining of abscess. **Materials and Methods:** Between May 2013 to May 2014, 25 cases of appendicular abscess were selected from the admitted patients (surgery department) in Enam Medical College & Hospital who underwent USG-guided percutaneous aspiration. Procedure was performed mostly under local anaesthesia. Patients were followed up for 6 months. Interval appendicectomy was not performed routinely. **Results:** USG-guided aspiration was successful in 23 (92%) patients and in 2 (8%) patients procedure failed. Single attempt was successful in 21 (84%) cases and 4 (16%) patients needed double attempt for draining appendicular abscess. In 23 (92%) patients, PCA was done under local anaesthesia and two (8%) patients needed general anaesthesia. Complications developed in 4 (16%) patients. Four (16%) patients needed follow-up USG. Average hospital stay was 5 days (2–8 days) and average duration of using I/V antibiotic was 3.5 days (2–5 days). **Conclusion:** USG-guided percutaneous aspiration is an easy and safe method for draining appendicular abscess with minimum procedural complications.

Key words: Appendicular abscess; Percutaneous aspiration; Interval appendicectomy

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Introduction

If the inflamed appendix is not treated timely, 2–14% of acute appendicitis manifest itself with a right iliac fossa mass and in its natural course it may turn into an abscess or may be resolved.¹⁻³ The management strategy of appendicular abscess is still surrounded with controversy.^{2,3} When an appendicular abscess is in evidence, many surgeons prefer conventional open drainage.⁴⁻⁶ The risk of open drainage includes more extensive surgery, risk of bowel injury and wound infection, longer hospital stay and additional

financial burden as well.⁷⁻⁹ With the advances in imaging technology, image-guided drainage of fluid collection is possible throughout the body cavities.¹⁰ As an imaging tool, USG is non-invasive, fast, non-radiating and cost-effective method for evaluating a patient with appendicular mass or abscess.¹¹ USG-guided aspiration is the least invasive procedure for draining appendicular abscess. The procedure avoids general anaesthesia, allows early ambulation and oral feeding of patient.¹² A good number of patients with complicated appendicitis in the form of appendicular

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abscess were admitted in Enam Medical College & Hospital. Many of them underwent conventional open drainage. And in the post-operative period some patients became a victim of anaesthetic hazards and later on wound infection. Moreover many of them could not afford the required treatment cost and underwent delayed wound management. This sort of morbidity could be reduced by carefully choosing cases of appendicular abscess.

Materials and Methods

This prospective observational study was conducted in the Department of Surgery in Enam Medical College & Hospital during the period of May, 2013 to May, 2014. Sample size was 25. All cases of appendicular abscess irrespective of age and sex were included. Patients who were unwilling to have procedure, having abscess <4 cm in size and clinically impalpable and who presented with diarrhoea were excluded. Clinical success was defined as patient recovery after single or double puncture with or without interval appendicectomy. Procedural failure was defined as inability to place the needle or dry tap or complications that compelled the procedure to postpone. Clinical failure was defined as worsening of patient’s symptoms and signs within 72 hours of procedure. Residual abscess was considered as the presence of abscess cavity after two weeks of procedure. Follow-up schedule was biweekly for two months, then at one month intervals for months. All patients were interviewed by using questionnaire containing socio-demographic and relevant information. General condition of the patient was evaluated through history, physical examination and by the help of investigation and subsequently the diagnosis was confirmed. A structured follow-up sheet was prepared for data collection. Patient was monitored from admission to discharge and also at out-patient department. The procedure does not conflict with any religious or social issues and does not involve asking participants to commit any acts that might cause them to experience embarrassment or regret. Ethical clearance was taken from ethical review committee of EMCH.

Results

Twenty five patients of appendicular abscess were selected for USG-guided percutaneous aspiration (PCA). PCA was successful in 23 (92%) patients.

Two (8%) patients needed conversion for drainage of abscess. Single attempt was successful in 21 (84%) patients and four (16%) patients needed second attempt for aspiration. Twenty-three (92%) aspiration were performed under local anaesthesia and two (8%) patients needed general anaesthesia. Frank pus was aspirated in 20 (80%) cases, blood-mixed pus was found in four (16%) cases and one (4%) case showed dry tap. Puncture site infection was noticed in one (4%) case, bleeding from puncture site in one (4%), residual abscess developed in one (4%) and one (4%) patient developed recurrent appendicitis. Twenty (80%) patients needed <3 days intravenous antibiotic. Hospital stay ranged from 2 to 8 days. One (4%) patient needed readmission for aspiration of residual abscess and one (4%) for interval appendicectomy.

Table I shows that in most of the patients aspiration was performed using 18G needle. Table II shows that only two (8%) patients needed general anaesthesia for drainage of appendicular abscess. Table III shows that procedure-related complications were minimum (12%).

Table I: Type of needle used for percutaneous aspiration of appendicular abscess (N=25)

Type of needle	Number of patients	Percentage
18G (Blood set)	23	92
20G I/V cannula	2	8

Table II: Type of anaesthesia needed for percutaneous aspiration of appendicular abscess (N=25)

Anaesthesia	Number of patients	Percentage
Local anaesthesia	23	92
General anaesthesia	2	8

Table III: Complications following USG-guided aspiration of appendicular abscess (N=25)

Complications	Number of patients	Percentage
Puncture site infection	1	4
Bleeding from puncture site	1	4
Residual abscess	1	4
Recurrent appendicitis	1	4

Discussion

Delayed presentation of acute appendicitis in the form of a circumscribed abscess in the right iliac fossa is not uncommon in our country. Low socioeconomic condition, illiteracy, misdiagnosis, self-medication, maltreatment, ignorance of available medical facilities are the risk factors for delayed presentation of acute appendicitis. The available treatment options of appendicular abscess are open or image-guided drainage with or without interval appendicectomy.¹³

In our study we used two types of needles for aspiration of appendicular abscess. Choice of needle depends on size and location of abscess cavity, it also depends on age and individual body mass index.¹⁴ Out of 25 patients, blood set needles (18G needle) were used in 23 (92%) patients and 20G needles were used in two (8%) patients. It is found that some researchers used spinal needles, angiographic needles and even I/V catheter set for draining appendicular abscess.¹⁵ In another study researchers suggested to use smaller needles for paediatric age group.¹⁶ As children have usually a thinner body wall, we used 20G I/V cannula in two patients who were under 13 years of age.

In several studies researchers used pig-tail catheters for draining appendicular abscess.¹⁷⁻¹⁹ Pig-tail catheters have some advantages. Once it is placed irrigation of abscess cavity and post-procedural tubogram can be done. But we did not use it because it lengthens hospital stay, is relatively costly, needs patient motivation and education regarding catheter care, specially after discharge of patients. Moreover the procedure of inserting a pig-tail catheter is more invasive and there is chance of inadvertent bowel injury. Furthermore, it may act as a route of infections and there is possibility of spontaneous expulsion. Therefore, we preferred blood set needle (18G) as it is stout, no chance of kinking, cost-effective and easily available in surgical ward and operation theatre also.

In this study, two (8%) out of 25 patients who were under 13 years of age needed general anaesthesia for draining of abscess. Hogan¹⁰ suggested that patients may be benefited from general anaesthesia if the procedure is likely to be more painful or patients are non-cooperative, specially in children. In the study of Lasson et al¹⁸ it was found that out of 24 patients with appendicular abscess, three subjects who were younger (3, 7 and 9-year-old) needed general anaesthesia.

We performed PCA under local anaesthesia for appendicular abscess in 23 (92%) patients. We believed that the patient having an appendicular abscess was already in a state of considerable discomfort. Therefore, we used an additional I/V analgesic in conjunction with local anaesthetic agent to minimise pain. Lasson et al¹⁸ found that out of 24 appendicular abscess, 21 (87.5%) procedures were done with local anaesthesia with addition of strong analgesic (pethidine) or I/V sedatives (midazolam).

In our study, procedure was successful in 23 patients and failed in two patients. One showed little amount of collection during aspiration, another developed bleeding from puncture site. Some researchers found that the procedure might fail if the abscess cavity was in inaccessible site or ruptured due to repeated puncture. Though we entered into the abscess cavity, it showed small collection, probably due to thickness of pus. However these findings do not match with previous study.¹⁸

In our study some complications were observed. Complications related to percutaneous drainage procedure are infrequent if proper technique is followed.²⁰ We found that one patient developed puncture site bleeding during procedure, one had puncture site infection one showed residual abscess and another developed recurrent appendicitis. Adverse events during percutaneous drainage procedure were well-documented in previous study. Marianne et al²⁰ drained 96 cases of intra-abdominal abscess by pig-tail catheter and complications developed in 30 patients. Most of the complications were drain-related. They noticed that catheters were blocked or damaged. Other adverse events included bleeding and fistula formation at the site of catheter entry and cellulitis surrounding the drain entry.

On follow-up USG we found that one patient developed residual abscess, which was managed by re-aspiration at OPD. Lasson et al¹⁸ found that two patients (4.7%) had residual abscess and were managed by repositioning of initially inserted drainage catheter or insertion of a new catheter.

We had to convert the percutaneous procedure to open drainage in two (8%) patients because one showed no collection during the procedure and another compelled us to postpone the procedure due to bleeding from

the percutaneous puncture site. Conversion to open drainage is well-documented in previous study.²¹⁻²³ Some authors reported that procedure failure, persistent residual collection, multiloculated abscess cavity are the risk factors for conversion. However, from best of my knowledge no one encountered bleeding from the puncture site as the reason for conversion. But some authors encountered bleeding from the puncture site as a minor complication²³.

We did not offer routine interval appendicectomy after successful drainage of appendicular abscess. The necessity of routine interval appendicectomy after drainage of appendicular abscess is still controversial.²⁴ Most of the recent literatures support the selective approach for interval appendicectomy. Moreover, interval appendicectomy needs readmission, may complicate the surgical procedure and subsequent development of post-operative morbidity.²⁵ We believe that after drainage of necrotic materials the remnant of appendix could heal and the inflammation could resolve without appendicectomy. Therefore, we did not suggest interval appendicectomy routinely.

Based on our findings, USG-guided percutaneous aspiration can be applied as the first line of treatment for draining uncomplicated appendicular abscess. Furthermore, special training is not necessary for application of this technique and the service can be provided at OPD in case of recurrent or residual abscess. But, where aspiration is failed open drainage still has a role.

Limitations

We did not include all cases of appendicular abscess, specially complicated by pelvic abscess or other post-operative intra-abdominal abscesses. Therefore, we cannot state with certainty that this technique can be applied for treatment of such abscesses. Sample size was relatively small and study period was also short as compared to other previous studies on similar disease. Some patients did not come for follow-up. They might develop recurrence and presented to other hospitals that could falsely alter our results. Lastly, long term effect of percutaneous aspiration could not be assessed.

USG-guided percutaneous aspiration is an easy, safe, effective and relatively atraumatic procedure for draining appendicular abscess. It reduces post-

operative morbidity, hospital stay and minimize procedure-related complications.

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