

# Effectiveness of Abdominal Abscesses Drainage by Percutaneous Guided Ultrasound

Fahad Mukhtar Hashmi<sup>1</sup>, Shahid Manzur<sup>1</sup>, Syed Hasnain Abbas<sup>3</sup>, Huma Jamil<sup>2</sup> and Munazza Zafar<sup>4</sup>

## ABSTRACT

**Objectives:** To assess the effectiveness of treatment of abdominal abscesses drainage by percutaneous guided ultrasound

**Study Design:** Randomized controlled trial.

**Place and Duration of Study:** This study was conducted at the Department of Diagnostic Radiology, Bahawal Victoria Hospital, Bahawalpur for 6 months from October 2015 to March, 2016.

**Materials and Methods:** In our study, 80 patients were included from the in-door General Surgery wards of Bahawal Victoria Hospital, Bahawalpur. Regardless of gender, age of the patients ranges between 20-45 years having localized abdominal abscess > 4 cm in size not responding to antimicrobial treatment. All patients with generalized collection, bleeding diathesis and with co-morbidities were excluded from the study. They were divided in two age groups from 20-30 ages and 31-45 age. In group-A, percutaneous drainage was done and in group-B surgical exploration was done. Procedures was done by consultant surgeon and Radiologist. After procedure patients were assessed for effectiveness according to operational definition. Results were analyzed by using SPSS version 11.

**Results:** The study shows that in 20-30 ages, there were 18 patients in Group-A, 45% and 21 patients in Group-B 52.5%. In 31-45 years of age, there were 22 patients were in Group-A 55% and 19 patients in Group-B 47.5%, mean and SD was calculated as  $32.54 \pm 2.63$  and  $29.24 \pm 2.34$  years respectively, In group-A, 14 were male 35% and 23 females 65%. In group-B, there were 17 male 42.5% and 23 females 57.5%. Comparison of efficacy of ultrasound guided percutaneous drainage in treatment of abdominal abscesses shows 33 patients, 82.5% in Group-A and 20 patients, 50% in Group-B were treated effectively,  $p$  value=0.002.

**Conclusion:** We concluded that Percutaneous ultrasound guided drainage of the abdominal abscesses is a better treatment strategy than surgery (exploratory laparotomy) and drainage of the pus. It is cost effective and reduce burden on hospital due to minimal stay in wards and expenditures.

**Key Words:** Abdominal Abscesses, ultrasound guided percutaneous drainage, exploratory laparotomy, effectiveness.

**Citation of article:** Hashmi FM, Manzur S, Abbas SH, Jamil H, Zafar M. Effectiveness of Abdominal Abscesses Drainage by Percutaneous Guided Ultrasound. *Med Forum* 2017;28(4):5-8.

## INTRODUCTION

Abdominal abscess continues to be an important and serious problem in surgical practice. In more than 80% of cases, abdominal abscess are derived from an intra-abdominal organ and in the most cases they develop

after operative procedures.<sup>1</sup> regarding anatomy, these can be divided into intra-peritoneal and visceral abscesses and those located in the anterior retroperitoneal space.

Intra-abdominal abscesses are life-threatening conditions requiring quick recognition, early diagnosis and prompt treatment. Imaging methods are especially important in diagnosis of abscesses.<sup>2,3</sup> Abscesses might be recognized on plain radiographs occasionally. But ultrasonography and C.T scans are the stable modalities for diagnosis and localization of intra-abdominal abscesses.<sup>4,5</sup>

Appropriate antimicrobial therapy, percutaneous ultrasound drainage and open surgical approaches are the mainstay of treatment of abdominal abscesses. Antimicrobial therapy can improve the patients who have abscesses of 4cm or less size; however patients with an abscesses diameter more than 6.5 cm have likelihood of failing conservative treatment with

<sup>1</sup>. Department of Radiology / Surgery<sup>2</sup>, Quaid-e-Azam Medical College/ Bahawal Victoria Hospital, Bahawalpur

<sup>3</sup>. Department of Paediatric Surgery Department, Jinnah Hospital, Lahore.

<sup>4</sup>. Department of Radiology, Allama Iqbal Medical College/Jinnah Hospital, Lahore.

Correspondence: Dr. Shahid Manzur Associate Professor Radiology Department, Quaid-e-Azam Medical College/ Bahawal Victoria Hospital, Bahawalpur.

Contact No: +93005009084

Email: drsmanzur@gmail.com

antimicrobial and require intervention (either percutaneous drainage or surgical intervention).<sup>6,7</sup> In some recent studies,<sup>8,9,10</sup> the complication rate in surgically drained patients (SD) was 64% whereas those who were treated by percutaneous drainage (PD) had complication rate of 27%. The mean general well being as measured by verbal scoring system in PD was  $3 \pm 1.1$  while in SD group, it was  $2 \pm 1.2$ .<sup>11</sup> In the PD group the mean heart rate was 100+1, in SD group 101+1.5. The mean size of abscess drained in SD group was  $8.2 \pm 1.1$  cm, in PD  $7.7 \pm 1.3$  whereas total leukocytes count in PD was  $6700 \pm 500$ ; in SD was  $7500 \pm 900$ .<sup>12</sup>

The aim of conducting this study is to evaluate effectiveness associated with ultrasound guided percutaneous drainage versus conventional open surgical. The basic rationale is that the technique which shows more effectiveness in subsequent patients in future.

## MATERIALS AND METHODS

Study was Randomized controlled trial. It was carried out in Department of Diagnostic Radiology, Bahawal Victoria Hospital, Bahawalpur. Study duration was 6 months. The calculated sample size with 80% power of study, 5% level of significance, the magnitude of complications with percutaneous drainage / aspiration as 27% and with surgical exploration as 64% assuming efficacy in PD as 73% and in surgical drained technique as 46%. The sample size required was 80 patients i.e. 40 in each group. Group A: 40 patients received percutaneous drainage of intra-abdominal abscess. Group B: 40 patients received surgical exploration of intra-abdominal abscess. Sampling technique was non-probability consecutive: Purposive Sampling Technique. Patients with age 20-45 years, regardless of gender having localized abdominal abscess size > 4 cm in either dimension, not responding to antimicrobials were included in the study. While all Patients with generalized collections (presence of free fluid in the abdominal cavity on USG), patients with bleeding diathesis (raised serum PT, APTT level) and patients who have co-morbidities, which might act as confounding variables, like Diabetes Mellitus, Malignancy, Chronic liver disease, malnutrition, and cold abscess etc were excluded.

Eighty patients, fulfilling the inclusion criteria were included from the indoor patient, Department of General surgery wards of Bahawal Victoria Hospital, Bahawalpur after approval from the hospital ethics committee. An informed consent was taken. Demographics of the patients were noted. Randomization of the patients in two groups was done by lottery method. The patients in group-A received percutaneous drainage, and patients in group-B received surgical exploration. The procedures were done by a consultant Surgeon and Radiologist having at least five years post fellowship experience. After the

procedure, the patients were assessed for the efficacy (as per operational definition). The data was collected on the proforma attached. Firstly, whole data was entered to SPSS version 11. The quantitative data like age was described as mean and standard deviation. The qualitative data like sex and efficacy was labeled as frequency distribution table. The two groups were compared for the statistical difference. Chi-square test was applied. P value < 0.05 was taken as significant. Stratification for age and gender was done to control the effect modifier.

## RESULTS

A total of 80 cases (40 in each group) fulfilling the inclusion/exclusion criteria were enrolled to assess the efficacy of ultrasound guided percutaneous drainage in treatment of abdominal abscesses.

Age distribution of the patients was recorded and presented, in 20-30 years range 18 patients, 45% were in Group-A and 21 patients 52.5% were in Group-B, In 31-45 years range 22 patients 55% in Group-A and 19 patients, 47.5% in Group-B years of age, mean and standard deviation was calculated as  $32.54 \pm 2.63$  and  $29.24 \pm 2.34$  years respectively. (Table No. 1)

The study results show that 14, 35% patients in Group-A and 17, 42.5% patients in Group-B were male and 26, 65% in Group-A and 23, 57.5% patients in Group-B were females. (Table No. 2)

Comparison of effectiveness of ultrasound guided percutaneous drainage in treatment of abdominal abscesses was done which showed 33, 82.5% patients in Group-A and 20, 50% patients in Group-B were treated effectively while the rest of 7, 17.5% patients in Group-A and 20, 50% patients in Group-B were not treated effectively (as per operational definition). P value=0.002. (Table No. 3)

**Table No. 1: Age distribution of the patients (No=80)**

Age(in years)	Group-A (No=40)		Group-B (No=40)	
	No. of patients	%	No. of patients	%
20-30	18	45	21	52.5
31-45	22	55	19	47.5
<b>Total</b>	<b>40</b>	<b>100</b>	<b>40</b>	<b>100</b>
<b>Mean +S.D</b>	<b><math>32.54 \pm 2.63</math></b>		<b><math>29.24 \pm 2.34</math></b>	

**Table No. 2: Gender distribution of the patients (No=80)**

Gender	Group-A (No=40)		Group-B (No=40)	
	No. of patients	%	No. of patients	%
Male	14	35	17	42.5
Female	26	65	23	57.5
<b>Total</b>	<b>40</b>	<b>100</b>	<b>40</b>	<b>100</b>

**Table No. 3: Comparison of effectiveness of ultrasound guided percutaneous drainage in treatment of abdominal abscesses (No=80)**

Efficacy	Group-A (No=40)		Group-B (No=40)	
	No. of patients	%	No. of patients	%
Yes	33	82.5	20	50
No	7	17.5	20	50
<b>Total</b>	<b>40</b>	<b>100</b>	<b>40</b>	<b>100</b>

P value=0.002

**Table No. 4: Stratification for effectiveness of ultrasound guided percutaneous drainage in treatment of abdominal abscesses with regards to age**

Age(in years)	Group-A (No =33)		Group-B (No=20)	
	No. of patients	%	No. of patients	%
20-30	19	57.58	14	70
31-45	14	42.42	6	30
<b>Total</b>	<b>33</b>	<b>100</b>	<b>20</b>	<b>100</b>

**Table No. 5: Effectiveness of ultrasound guided percutaneous drainage in treatment of abdominal abscesses with regards to gender**

Gender	Group-A (No=33)		Group-B (No=20)	
	No. of patients	%	No. of patients	%
Male	10	30.30	8	40
Female	23	69.70	12	60
<b>Total</b>	<b>33</b>	<b>100</b>	<b>20</b>	<b>100</b>

The effectiveness of ultrasound guided percutaneous drainage in treatment of abdominal abscesses with regards to age which shows that out of 33 cases in Group-A, 19 patients 57.5% were between 20-30 years and 14, 42.4% patients were between 31-45 years of age, while in Group-B out of 20 cases 14 patients 70% were between 20-30 years and 6 patients 30% were between 31-45 years. (Table No. 4)

The effectiveness of ultrasound guided percutaneous drainage in treatment of abdominal abscesses with regards to gender which shows that out of 33 cases in Group-A, 10 patients, 30.3% were male and 23 patients, 69.7% were females, while in Group-B out of 20 cases 8 patients, 40% were male and 12 patients, 60% were female. (Table No. 5)

## DISCUSSION

In acute abdomen, surgical intervention are infrequently complicated by intra-abdominal and pelvic abscesses and fluid collections.<sup>13,14</sup> Post surgical intra-abdominal abscesses are most common.<sup>15,16</sup> Treatment of these abscesses and collections, traditionally required clinical

diagnosis and surgical intervention, and this has been revolutionized by high-resolution radiologic techniques such as Ultrasonography and CT Scanning.<sup>15,17</sup>

These studies permit precise anatomic localization of the abscesses and fluid collections and non-surgical drainage using percutaneous techniques.<sup>15</sup>

The aim behind conducting this study was to evaluate the effectiveness associated with ultrasound guided percutaneous drainage versus conventional open surgery.

The study reveals 18 patients, 45% in Group-A and 21 patients, 52.5% in Group-B were between 20-30 years of age. In 31-40 years ages, 22 patients, 55% in Group-A and 19 patients, 47.5% in Group-B were assessed. The mean and SD was calculated as  $32.54 \pm 2.63$  and  $29.24 \pm 2.34$  years respectively, 14 patients 35% in Group-A and 17 patients 42.5% in Group-B were male. 26 patients 65% in Group-A and 23 patients 57.5% in Group-B were females. Comparison of effectiveness of ultrasound guided percutaneous drainage in treatment of abdominal abscesses shows 33 patients 82.5% in Group-A and 20 patients 50% in Group-B were treated effectively, p value=0.002.

Saleem M and co-workers determined ultrasound guided percutaneous drainage of abdominal abscesses and recorded 96.2% of the cases treated successfully.<sup>18</sup> Olaket al<sup>19</sup> series having closely matched patients also substantiated this. Although both surgical drainage and percutaneous drainage have lower success rate in complex abscesses, percutaneous drainage has less morbidity and mortality in this cases.<sup>19</sup>

The available data including ours confirm the superiority of percutaneous drainage in simple abscesses., Olaket al recommend surgical intervention in them at the outset.<sup>19</sup> Other workers, however, consider percutaneous drainage worth trying as even if it fails to prevent surgical intervention, it can be a useful temporary measure.<sup>20</sup> Further in moribund patients, percutaneous drainage is the only option available.

We did not include in our current study, complication of the percutaneous drainage, due to limitation of our study, but the literature review illustrates that major complications reported are bowel and vascular injury<sup>21</sup> and recurrent and secondary abscesses. Bowel injury may go unrecognized at the time of procedure to appear later as entero-cutaneous fistula. It often closes spontaneously.<sup>20</sup>

Vascular injury can lead to visceral hematoma or bleeding in the peritoneum. Serious bowel, vascular injury can be avoided by proper technique and careful planning. Prior diagnostic needle aspiration is an additional safeguard.<sup>22</sup>

Recurrent abscess formation, quite rare after surgical drainage, is relatively uncommon after percutaneous drainage; up to 5% in reported series.<sup>22</sup> These are treatable by repeating percutaneous drainage.

However, considering the above facts the hypothesis of the study that "Percutaneous guided drainage of the abdominal abscesses is a better treatment strategy than surgery (exploratory laparotomy and drainage of the pus)" is justified and the technique may be used in our population.

## CONCLUSION

We concluded that percutaneous ultrasound-guided drainage of the abdominal abscesses is effective and better treatment strategy than surgery (exploratory laparotomy) and drainage of the pus. It can easily be done in Radiology Department, It is cost effective, reduces burden on the hospital and patient with reduction in patient stay in hospital and expenditures.

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

## REFERENCES

1. Sozen S, Emir S, Altinsoy HB. Intraabdominal abscess following inguinal hernioplasty. *Pak J Med Sci* 2011;27:218-9.
2. Kumar RR, Kim TT, Haukoos JS, Macias LH, Dixon MR, Stamon MJ. Factors affecting the successful management of intra abdominal abscesses with antibiotics and the need for percutaneous drainage. *Dis Colon Rectum* 2006;49:183-9.
3. Alvi AR, Kulsoom S, Shami G. Splenic abscess: outcome and prognostic factors. *J CollPhysiSurg Pak* 2008;18:740-3.
4. Buckley BT, Goodwin M, Boardman P, Uberoi R. Percutaneous abscess drainage in the UK: A national survey and single centre study. *ClinRadiol* 2006; 61:55-64.
5. Kuo YC, Mondschein JI, Soulen MC, Patel AA, Nemeth A, Stavropoulos SW ,et al. Drainage of collection associated with hernia mesh: is it worthwhile? *J Vas intervRadiol* 2010;21:362-6.
6. Singh O, Gupta S, Moses S, Jain DK. Comparative study of catheter drainage and needle aspiration in management of large liver abscesses. *Ind J Gastroenterol* 2009;28:88-92.
7. Lin AC, Yeh DY, Hsu YH, Wu CC, Change H, Jang TN, et al. Diagnosis of pyogenic liver abscess by abdominal ultrasound in the emergency department. *Emerg Med J* 2009;26:273-5.
8. KC S, Sharma D. Long-term follow up of pyogenic liver abscess by ultrasound. *Eur J Radiol*. 2010; 74:195-8.
9. Singh B, May K, Coltrat I, Moore NR, Cunningham C. The long-term results of percutaneous drainage of diverticular abscess. *Ann R CollSurg Engl* 2008; 90:297-301.
10. Ferraioli G, Garlaschelli A, Zanaboni D, Gulizia R, Brunetti E, Tinazzi FP,et al. Percutaneous and surgical treatment of pyogenic liver abscesses: observation over a 21-year period in 148 patients. *Dig Liver Dis* 2008;40:690-6.
11. Chung YF, Tan YM, Lui HF, Tay KH, Lo RH, Kurup A. Management of pyogenic liver abscesses - percutaneous or drainage? *Singapore Med J* 2007; 48:158-65.
12. Zerem E, Hadzie A. Sonographically guided percutaneous catheter drainage versus needle aspiration in the management of pyogenic liver abscess. *AJR Am J Roentgenol* 2007;189:138-42.
13. Bernini A, Spencer MP, Wong WD, Rothenberger DA, Madoff RD. Computed tomography-guided percutaneous abscess drainage in intestinal disease: factors associated with outcome. *Dis Colon Rectum* 1997;40:1009-13.
14. Theisen J, Bartels H, Weiss W, Berger H, Stein HJ, Siewert JR. Current concepts of percutaneous abscess drainage in postoperative retention. *J Gastrointest Surg* 2005;9:280-3.
15. Antevil JL, Egan JC, Woodbury RO, Rivera L, O'Reilly EB, Brown CV. Abdominal computed tomography for postoperative abscess: is it useful during the first week? *J Gastrointest Surg* 2006; 10:901-5.
16. MacErlean DP, Gibney RG. Radiological management of abdominal abscesses. *J R Soc Med* 1983;76:256-61.
17. Machi J, Sigel B, Beitler JC, Coelho JC, Donahue PE, Duarte B, et al. Ultrasonic examination during surgery for abdominal abscess. *World J Surg* 1983;7:409-15.
18. Saleem M, Ahmad N, Ahsan I. Ultrasound guided percutaneous drainage of abdominal abscesses. *JPMA* 2000;50:50-1.
19. Olak J, Christou NV, Stein LA, Casola G, Meakins JL. Operative vs percutaneous drainage of intra-abdominal abscesses. Comparison of morbidity and mortality. *Arch Surg* 1986;121:141-6.
20. Larneris S, Bruining HA, Jeekel J. Ultrasound guided percutaneous drainage of abdominal abscesses. *Br J Surg* 1987;74:620-3
21. Kanson KB, Martin E', FannKuchcn El. Percutaneous abscess drainage. *SurgGynecolObst* 1982;145:120-5
22. Hagg JR, Weinstein A. CT guided percutaneous aspiration and drainage of abscesses. *Am J Roentgenol* 1980;135:1187-90.