

Acute Septic Arthritis: Open Drainage versus Needle Aspiration

1. Roohullah Jan 2. Zahid Askar

1. Medical Officer, Dept. of Orthopedics & Traumatology 2. Prof. of Orthopedics & Traumatology,
Khyber Teaching Hospital, Peshawar, Khyber Pakhtunkhwa

ABSTRACT

Objective: This study aims to compare the effectiveness of open drainage with needle aspiration in acute septic arthritis in our local population.

Study Design: Randomized controlled trial.

Place and Duration of study: This study was conducted in Orthopedics and Trauma unit, Khyber Teaching Hospital, Peshawar from Feb 2009 to Jan 2010.

Materials and Methods: There a total of 114 patients that were randomly assigned to group A and B with 57 patients in each group. Group A was subjected to open drainage and Group B to needle aspiration. The effectiveness of intervention was assessed by the reduction of at least one grade of pain from the baseline on 7th post-operative day.

Results: In group A 26 (45.61%) and 31 (54.38%) patients had Grade 2 and Grade 3 pain respectively whereas in group B 28(49.12%) and 29(50.88%) patients had Grade 2 and Grade 3 pain respectively(p value 0.0025). Open drainage and needle aspiration in group A and B were effective in 49 (85.96%) and 39(68.42%) patients respectively (p value 0.0025).

Conclusion: Open drainage is more effective than needle aspiration in patients with acute septic arthritis.

Key Words: Septic Arthritis; Open drainage; Needle Aspiration.

INTRODUCTION

Acute septic arthritis or suppurative arthritis is an infection of the joint by microorganisms resulting in purulent effusion into the joint capsule.¹

Knee and hip joints are most commonly involved in acute septic arthritis (ASA) in adults and children respectively. The annual incidence of acute septic arthritis ranges from 2 to 10 percent per 100,000 population.² The incidence of septic arthritis has been noted 34% higher in males as compared to females.³ Acute septic arthritis is an orthopedic emergency⁴ and delayed or inadequate treatment can lead to significant morbidity and mortality.⁵

The prognosis is directly related to host factors, the virulence of the infecting organism, and the promptness of treatment.⁴ Despite of more effective antibiotics and advanced methods of joint drainage, about one third of patients need amputation, arthrodesis, prosthetic surgery or functional impairment due to cartilage degradation and irreversible bone loss⁶, systemic sepsis and death.⁷ Acute septic arthritis was a fatal disease whose mortality was 50% in 1874⁸ but due to development of various antibiotics and general progress in the management of septic patients, now a days, the mortality rate ranges from 10 to 15%.⁹

There are a variety of methods to drain the purulent fluid from the infected joint including needle aspiration, tidal irrigation, arthroscopy, and arthrotomy. There is no set of universally accepted criteria for choosing the drainage method to clean the joint of harmful degradative products, to control the infection, and to preserve the articular cartilage and function of the joint.¹⁰ However the treatment principle is pus

evacuation in any possible technique.¹¹ The comparative studies between repeated needle aspiration and open surgical drainage of ASA has been done previously but this comparison has controversies.^{12,13} Some authors have concluded that aspiration is a satisfactory method for all joints except the hip¹² and open surgical drainage is necessary especially in children² and others that the hip joint can be satisfactorily aspirated and claim that the technique of aspiration has become the usual practice in several pediatric orthopedic departments.¹¹ The current study was designed to determine the best treatment option for ASA in our local population after comparing the open drainage and needle aspiration.

MATERIALS AND METHODS

This study was conducted at Orthopedics and Trauma unit, Khyber Teaching Hospital, Peshawar from August 02, 2011 to February 02, 2012. All patients 10 years old and above, with ASA of knee, hip, elbow and shoulder joints with Grade 2 (moderate) to Grade 3 (severe) pain were included in the study. Patients with infected prosthetic joints (hemi arthroplasty and total arthroplasty), with adjacent osteomyelitis preceding joint infection evident by plan radiographs of the effected joint and those with pre-existing osteoarthritis, rheumatoid arthritis and gout were excluded from the study. Patients with diabetic mellitus were also excluded from the study due to their peripheral neuropathies and altered sensations of pain.

The study was conducted after approval from hospitals ethical and research committee. The purpose and benefits of the study were explained to all patients and

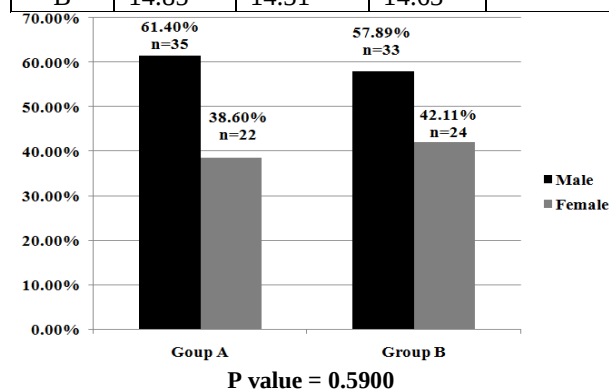
if agreed upon, a written informed consent was obtained. All patients were worked up with detailed history and clinical examination followed by routine baseline pre-operative investigations. The patients were randomly allocated in two groups by lottery method. Patients in group A were subjected to open drainage for ASA and patients in group B were subjected to needle aspiration for ASA. Needle aspiration was done under local anesthesia and repeated after 24 hours. Patients in open drainage group were prepared for surgery under general anesthesia on next OT day and a suction drain was put in place to keep draining the joint fluid and was removed after 24 hours. Post operatively, all patients in both groups were kept under observations for 24 hours and discharged on the 2nd post-operative day if indicated. All the patients were followed up after 7 days to determine intervention effectiveness in terms of reduction in at least one grade of pain from the baseline preoperative grade. Chi square test was used to compare the effectiveness between needle aspiration and open drainage. P value of < 0.05 was considered significant. Effectiveness was stratified among age, gender, baseline grade of pain and joint involved to see the effect modifications.

RESULTS

The total number of patients in Group A and B each was 57. The overall mean age in group A and B was 31.89 years $\pm$ 14.24SD and 33.01 years $\pm$ 14.63SD respectively with insignificant p value of 0.3266. Comparison of open drainage versus needle aspiration is presented in graphic and tabular form. Results are stratified according to age, gender and joint involved.

Table No. 1: Mean age and standard deviation of patients with acute septic arthritis in group A (open drainage) & B (needle aspiration)

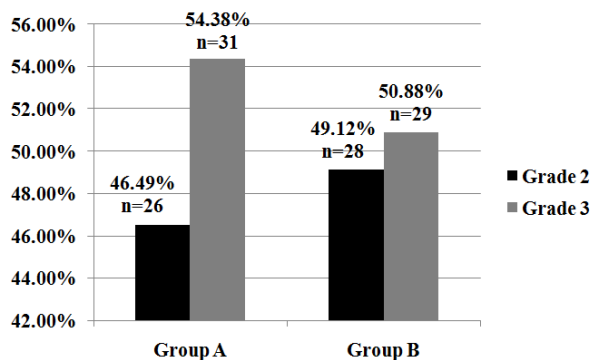
Group	Mean $\pm$ SD			P value
	Male	Female	Total	
Group A	33.14 $\pm$ 15.45	28.32 $\pm$ 10.20	31.89 $\pm$ 14.24	0.3266
Group B	30.67 $\pm$ 14.85	28.80 $\pm$ 14.31	33.01 $\pm$ 14.63	



Graph No. 1: Gender Distribution Of Patients With Acute Septic Arthritis In Group A (Open Drainage) & B (Needle Aspiration)

Table No. 2: Frequency of joint involvement in patients with acute septic arthritis in group A (open drainage) & B (needle aspiration)

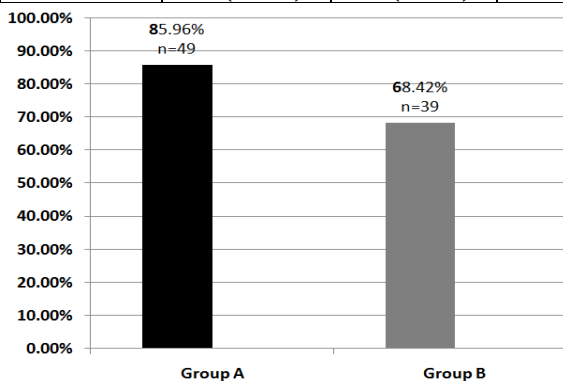
Joint Involved	Group A	Group B	P value
Shoulder Joint	3 (5.26%)	2 (3.51%)	0.831
Elbow Joint	12 (21.05%)	10 (17.54%)	
Hip Joint	20 (35.08%)	23 (40.35%)	
Knee Joint	22 (38.59%)	22 (38.59%)	



Graph No. 2: Base line pre operative grade of pain in patients of open drainage (group A) and needle aspiration (group B) of acute septic arthritis

Table No. 3: Stratification of effectiveness of open drainage (group a) and needle aspiration (group b) in patients with acute septic arthritis according to age

Age Groups (years)	Group		P value
	Group A	Group B	
10-20	10 (20.40%)	18 (46.15%)	0.342
21-30	21 (42.85%)	13 (33.33%)	
31-40	9 (18.36%)	3 (7.69%)	
41-50	5 (10.20%)	2 (5.13%)	
51-60	3 (6.12%)	2 (5.13%)	
61 and above	2 (4.75%)	1 (2.56%)	
Total	49 (100%)	39 (100%)	



Graph No. 3: Effectiveness of open drainage (group A) and needle aspiration (group B) in patients with acute septic arthritis

DISCUSSION

Septic arthritis is a substantial public health problem, accounting for 0.2-0.7% of hospital admissions. However, despite the availability of effective antibiotics, the appropriate approach to adjunctive therapy remains controversial. Although early drainage is essential to minimize the risks of permanent loss of articular function, it is unclear whether the optimal approach involves arthroscopic lavage or daily arthrocentesis; surgeons appear to prefer surgical lavage because their training routinely considers septic arthritis to be a closed-space infection comparable to an abscess, whereas rheumatologists appear to prefer daily arthrocentesis because of its ease and non-invasive nature. There is a paucity of prospective data comparing the two approaches, and the literature is largely retrospective.¹⁵

In our study majority of patients presented with Knee and hip septic arthritis in both groups. In a study conducted at china, septic arthritis of hip and knee was mostly reported affected joints (33% and 35.4%).⁵ In a local study by Shabir M,¹⁶ hip joint was most commonly involved (40.8%) followed by knee joint (31.8%). In our study the involvement of different joints was insignificant regarding the effectiveness of open drainage and needle aspiration (p value 0.831).

Removal of purulent material from affected joint is considered essential in the effective management of septic arthritis, although this is based on expert opinion rather than any randomized controlled trial¹⁷. This can either be achieved surgically by arthroscopy or open arthrotomy, or through closed needle aspiration. There is controversy regarding which method is better, and a systematic review of the literature in 2007 did not reveal any prospective studies in adults addressing this question¹⁸.

In our study, open drainage was more effective (85.96%) as compared to needle aspiration (68.42%) in terms of improvement in at least one grade of pain on Visual Analogue Scale at 5th day follow up and this was also statistically significant (0.0025). This correlates well with Kang SN et al¹⁴ who has reported arthrotomy as the best method of treatment and has reported that open drainage was successful in 92.59% with failure in only 7.41% and needle aspiration was successful in 54.55% with failure in 45.45% of cases. Similarly in a local study by Shabir M¹⁶, open drainage was more successful (57.9%) as compared to needle aspiration (48.8%).

In our study the values for distribution of gender (p value 0.5900), mean ages of patients (p value 0.3266), effectiveness according to age (p value 0.342), gender (0.755), base line grade of pain (0.022) and joint involvement were statistically insignificant. This observation has also been noted by Kocher MS et al.²¹

CONCLUSION

Open drainage is more effective than needle aspiration in patients with acute septic arthritis in terms of improvement in at least one grade of pain on Visual Analogue Scale at 7th day follow up. The best treatment option for ASA in our local population after comparing the open drainage and needle aspiration is open drainage of infected joint in terms of improvement of pain. It is recommended to other orthopedic surgeons to adopt the open drainage as a first line of treatment option for all patients with acute septic arthritis.

REFERENCES

1. Margaretten ME, Kohlwe J, Moore D, Bent S. Does this adult patient have septic arthritis? JAMA 2007;297(13):1478-88.
2. Torre IGL. Advances in the Management of Septic Arthritis. Infect Dis Clin N Am 2006;20:773-88.
3. Iqbal K, Ashfaq K, Tago IA, Soomro Y. Organisms responsible for acute septic arthritis at different age groups. Pak J Orthopaedic Surg 2008;20(2):125-9.
4. Visser S, Tupper J. Septic until proven otherwise: Approach to and treatment of the septic joint in adult patients. Canadian Family Physician 2009; 55:374-5.
5. Morina F, Bytyci C, Krasniqi R, Shabani E, Mustafa A. Management of 44 cases of septic arthritis in children. J Chin Clin Med 2009;4(5): 282-5.
6. Mathews CJ, Kingsley G, Field M, Jones A, Weston VC, Phillips M, et al. Management of septic arthritis: a systematic review. Ann Rheum Dis 2007;66:440-5.
7. Holtom PD, Borges L, Zalavras CG. Hematogenous septic ankle arthritis. Clin Orthop Relat Res 2008;466:1388-91.
8. Kariminasab MH, Azar MS, Saravi MS. Surgical Intervention for Treatment of Septic Arthritis in Infancy and Childhood; A Retrospective Study. Arch Iranian Med 2009;12 (4):409-11.
9. Abid N, Bhatti M, Azharuddin M, Islam M. Septic Arthritis in a Tertiary Care Hospital. J Pak Med Assoc 2006;56(3):95-8.
10. El-Sayed AMM. Response to Uri Givon. Re: Treatment of early septic arthritis of the hip in children: comparison of results of open arthrotomy versus arthroscopic drainage; Letter to the editor. J Child Orthop 2008;2:497.
11. Givon U, Gane A. Re: Treatment of early septic arthritis of the hip in children: comparison of results of open arthrotomy versus arthroscopic drainage; Letter to the editor. J Child Orthop 2008;2:499.
12. Ravindran V, Logan I, Bourke1BE. Medical vs surgical treatment for the native joint in septic

- arthritis: a 6-year, single UK academic centre experience; concise report. *Rheumatol* 2009;48:1320-2.
13. Lavy CB. Septic arthritis in western and sub-saharan african children; A review. *Int Ortho* 2007;31:137-44.
 14. Kang SN, Sanghera T, Mangwani J, Paterson JMH, Ramachandran M. The management of septic arthritis in children; review article. *J Bone Joint Surg* 2009 Sept;91B(9):1127-33.
 15. Manadan AM, Block JA. Daily needle aspiration versus surgical lavage for the treatment of bacterial septic arthritis in adults. *Am J Ther* 2004;11(5):412-5.
 16. Shabir M. Acute septic arthritis and its management. *J Postgrad Medic Inst* 2004;18(2):269-74.
 17. Coakley G, Mathews C, Field M, Jones A, Kingsley G, Walker D, et al. BSR & BHPR, BOA, RCGP and BSAC guidelines for the management of the hot swollen joint in adults. *Rheumatol (Oxford)* 2006;45:1039-41.
 18. Mathews CJ, Coakley G. Septic arthritis: current diagnostic and therapeutic algorithm. *Current Opinion in Rheumatol* 2008;20:457-62.
 19. Ravindran V, Logan I, Bourke BE. Medical vs surgical treatment for the native joint in septic arthritis: a 6 year, single UK academic centre experience. *Rheumatol* 2009;48(10):1320-2.
 20. del Val del Amo N, Erausquin Arruabarrena C, Blanco R, PinillosAransay V, MartínezTaboada V, Rodríguez Valverde V. Study of 112 patients with septic arthritis caused by pyogenic organisms and fungi: changes in the clinical spectrum during the last 2 decades. *Rev Clin Esp* 1997;197(8):540-4.
 21. Kocher MS, Mandiga R, Murphy JM, Goldmann D, Harper M, Sundel R, et al. A clinical practice guideline for treatment of septic arthritis in children: efficacy in improving process of care and effect of outcome of septic arthritis of the hip. *J Bone Joint Surg* 2003;85-A(6):994-9.

Address for Corresponding Author:**Dr. Roohullah Jan**

House No. 406, Street No. 4, Sector F-9,
Phase-6, Hayatabad,
Peshawar, Khyber Pakhtunkhwa.
Cell No. 03339286929
Email: janroohullah@gmail.com