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Arthroscopic drainage of acute septic arthritis of knee in adult

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Abstract

Aim: To evaluate effectiveness of arthroscopic drainage of acute septic arthritis knee in adult population.

Materials and method: 19 patients with average age of 38.9 years (19-66 years) evaluated retrospectively and prospectively, for a minimum follow-up period of 6 months (6-28 months), on Tegner-Lysholm Knee Scoring Scale. Arthroscopic drainage was performed on these patients at an average delay of 6.84 (4-17) days after onset of symptoms, followed by immediate intravenous antibiotics and then oral therapy, as per culture-sensitivity, with active physiotherapy. Repeat arthroscopic lavage was performed where required.

Results: 16 of 19 patients (84.2%) had good or excellent results, while 3 had fair results, of which 2 had recurrence of acute septic arthritis and 1 progressed to chronic osteomyelitis of tibia. Successful elimination of infection seen in 94.7%.

Conclusion: Arthroscopic drainage is safe and effective alternative to the gold standard procedure of open arthrotomy and debridement for acute septic arthritis knee in adult population. Early debridement and lesser Gachter stage more often lead to good to excellent results.

Keywords: Arthroscopic drainage, septic arthritis, adult

Introduction

Septic arthritis is a diagnostic and therapeutic emergency condition. Knee is the most common site for septic arthritis followed by shoulder, hip and ankle^[1]. Incidence of septic arthritis is estimated to upto 10 per 1,00,000 population. Mortality rate has been estimated to 10%, increasing to 30% in those aged more than 50 years and with co-morbidities. Functional impairments have been reported in upto 50% cases^[2-10].

After diagnosis of septic arthritis, drainage and debridement is the treatment through various modalities such as repeated needle aspirations, open arthrotomy and drainage, arthroscopic drainage and lavage.

2. Materials and method

Patients presenting with septic arthritis of knee between 2012 to 2015 were drained using arthroscopic technique and followed-up prospectively. Patients those were operated using arthroscopic drainage before this period was followed-up retrospectively. A total of 19 patients, male 11 and female 8, with involvement of single knee joint were included in the study, conducted at Nil Ratan Sircar Medical College and Hospital, Kolkata, India.

Co-morbid conditions included 4 patients with diabetes and 1 with impaired renal function, 2 patients with prolonged glucocorticosteroid therapy for rheumatoid arthritis.

The cause of infection being hematogenous 12, local intra-articular injection 2, trauma 4, following arthroscopic ACL ligament reconstruction 1.

Clinical features to diagnose septic arthritis included pain, swelling over the knee, local warmth, redness, tenderness, reduced range of motion, inability to bear body weight, systemic features of fever with/without chills.

On suspicion of septic arthritis joint aspiration was done under sterile preparation, send for cell count, cell type, culture and sensitivity. Blood culture was sent routinely with complete blood count, ESR, CRP and followed-up at regular intervals.

Arthroscopic drainage was performed at average 6.84 days after onset of symptoms, ranging from 4 to 17 days. At our centre drainage procedure was performed within 2 days of presentation.

2.1-Operative technique: Standard arthroscopic set-up was used. Pneumatic tourniquet was applied without exsanguination of the limb and antero-medial and antero-lateral portals made. Additional portals postero-medial, postero-lateral and supero-lateral were created as per need for thorough debridement. Intra-operative Gachter staging was done. Thorough lavage for anterior, posterior and suprapatellar compartments and medial and lateral gutters was done with minimum 10L of normal saline using arthroscopic pump, till all fibrinoid exudates was cleared. Synovial membrane biopsy done for all cases. Intra-articular drain placed and compression bandage applied.

Gachter criteria ^[11]

Stage 1	Blurred effusion, hyperemia synovium
Stage 2	Purulent effusion, fibrin deposits, hypertrophic synovium
Stage 3	Synovial adhesions, necrotic areas in the synovium and cartilage
Stage 4	Diffuse necrosis in the cartilage, bone erosion and osteolysis

2.2-Post-operative care: Injectable antibiotics started immediately with Cefuroxime and Amikacin. Patients put to non-weight bearing initially, but encouraging knee movement, both active and passive, as early as possible, as pain reduced. Patients were assessed daily clinically and complete blood count, ESR, CRP on alternate days. Two patients required repeat arthroscopic lavage. Patients improving clinically,

supported with laboratory evidence were given intra-venous antibiotics for minimum 10 days as per culture-sensitivity reports and then switched to oral antibiotic regime for minimum 4 weeks.

2.3-Follow-up: Patients were regularly followed-up at 3 weeks intervals, assessed clinically with ESR and CRP levels during continuation phase of antibiotic therapy. Thereafter, followed up at 2 months interval for first 6 months, then 3 month intervals for another year. Tegner-Lysholm Knee Scoring Scale was used at follow-up for assessment.

Grading of Tegner-Lysholm Knee Scoring Scale ^[12, 13]

<65	Poor
65-83	Fair
84-90	Good
>90	Excellent

3. Results

Average follow-up period was 11.2 months (range 6-28 months).

Infection was controlled in 18 out of 19 patients (94.7%). 2 patients (10.5%) required repeat joint lavage for recurrent acute septic episode in follow-up period, 1 patient developing chronic osteomyelitis of tibia with severe joint destruction.

16 patients (84.2%) had good or excellent results while 3 (15.8%) had fair results as per grading based on Lysholm-Tegner Knee Scoring Scale. Lower Gachter stage resulted in good to excellent results. 14 (73.68%) patients had Gachter stage 1 or 2. Those with fair results, 1 each had diabetes and rheumatoid arthritis as co-morbid condition.

Causative agent was *Staphylococcus aureus* in 14 (73.7%), *Staphylococcus epidermidis* in 1 (5.2%) and *E. coli* in 4 (21.1%).

Sl. No.	Age	Co-morbidity	Cause	Days to drainage	Gachter Stage	Tegner-Lysholm scale Grade
1	46	-	hematogenous	5	2	excellent
2	19	-	hematogenous	4	1	excellent
3	52	Diabetes	hematogenous	5	2	good
4	31	-	trauma	8	2	good
5	53	Diabetes	hematogenous	4	2	good
6	32	-	hematogenous	6	2	excellent
7	47	Rheumatoid arthritis	injection	8	3	fair
8	29	-	Post ACL Reconstruction	4	1	excellent
9 *	40	-	hematogenous	11	3	good
10	66	Diabetes	trauma	7	3	fair
11	51	Diabetes	hematogenous	7	2	good
12	46	Rheumatoid arthritis	injection	10	3	good
13	34	-	hematogenous	5	2	excellent
14 **	36	-	hematogenous	17	3	fair
15	19	-	trauma	5	2	excellent
16	64	Renal dysfunction	hematogenous	9	2	good
17	20	-	hematogenous	6	2	good
18	31	-	hematogenous	5	2	excellent
19	23	-	trauma	4	1	excellent

* Required repeat arthroscopic lavage

** Required repeat arthroscopic lavage for recurrence of acute septic arthritis, ultimately developing chronic osteomyelitis of tibia.

4. Discussion

The success rate for eliminating infection by arthroscopic debridement in septic arthritis have been reported between 79% and 100% ^[14, 15]. Arthroscopic drainage and debridement leads to better functional outcome and decreased morbidity ^[16]. Factors associated with better results were early diagnosis and treatment, proper joint drainage, appropriate systemic and oral antibiotics and early rehabilitation ^[2]. In our study, success rate is seen to be 94.7% and good to excellent functional result in

84.2%. Bussiere and Beaufils reported good to excellent functional results in 13 of 14 patients (92.8%) ^[9].

Yanmis et al in a similar study reported positive correlation with lower Gachter stage with good to excellent results based on Bussiere and Beaufils functional evaluation scale, with 65% excellent and 25% good results ^[9,11]. *Stutz et al* reported success rates of 96, 95 and 67%, respectively, in patients with Gachter stages 1, 2 and 3^[17]. *Aim et al* also found Gachter stage to be most important prognostic factor ^[18].

The time interval between onset of symptoms and drainage bear prognostic correlation on long term results. *Wirtz et al* reported better results in those drained in less than 12 days of onset ^[19].

The limitations of our study was small study population, single centre study.

5. Conclusion

Arthroscopic drainage of septic arthritis of knee is an effective method of treatment with good to excellent functional results.

6. References

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