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Drainage of septic knee joint using redivac drain and lavage under local anesthesia

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ABSTRACT

Objective: investigate the use redivac drainage tubes to drain septic knee arthritis in patients who are unfit for general anesthesia using local anesthesia as an alternative method in treating septic knee arthritis. *Methods*: sixteen patients between 20 to 65 year old age who had septic knee arthritis and were unfit for general anesthesia underwent local drainage using redivac tubes and continuous isotonic fluid irrigation under local anesthesia. *Results*: all of the 16 patients showed improvement very soon after the procedure in clinical and laboratory measurement, with early joint movement and rehabilitation. *Conclusions*: Treating septic knee arthritis surgically as an emergency in patients who are unfit for general anesthesia by using redivac drain and lavage under local anesthesia provide an excellent alternative way that may save patients' lives and decrease their morbidity.

Keywords: septic knee arthritis, drain, suction tubes, anesthesia

1. INTRODUCTION

Septic arthritis is an inflammation of a joint that's caused by infection. Although septic arthritis is usually monoarticular, up to 20 percent of cases are oligoarticular. The incidence of bacterial infections in the large joints is 2 in 100,000 per year, the knee joint is the most frequently affected (Canale and Beaty, 2013), followed by the hip, shoulder, ankle, elbow, and wrist (Horowitz et al., 2011). The joint is swollen, painful and inflamed; the white cell count and ESR are elevated. Aspiration reveals pus in the joint; fluid should be sent for bacteriological investigation, including anaerobic culture (Leighty et al., 1993).

Septic knee arthritis considered as a medical emergency, if untreated it may destroy the joint, the infection may spread to other parts of the body. Early diagnosis and management of septic knee arthritis is crucial, delayed or inadequate treatment of septic arthritis can lead to irreversible joint destruction with subsequent disability (Weston et al., 1999). There is significant mortality with an estimated case mortality rate of 11 % (Gupta et al., 2001). Prompt treatment with antibiotics together with removal of any purulent material is the mainstay of treatment for septic arthritis. The choice of antibiotic is based on the likelihood of the organism involved, modified by the results of Gram staining and culture. In acute septic arthritis,

usually anteromedial arthrotomy or arthroscopic drainage and antibiotic treatment are adequate. Arthroscopic drainage is superior to arthrotomy, both of them done almost in general anesthesia.

2. PATIENTS AND METHODS

A 16 patients who had septic knee arthritis unfit for general anesthesia underwent drainage using redivac drain by local anesthesia, in the orthopedic unit in al-imamain al-kadhimain medical city in the period from July 2019 to July 2020. Patients ages between 25 to 75 years old. The causes of unfitness for general anesthesia were severe cardiovascular impairment, renal impairment, and severe debilitating patients. We operate in the major theatre operative room with local anesthesia, some cases we did it in the inpatient ward or in outpatient ward in the minor surgery room. The patient in lying supine position sometime give the patient sedatives, anxiolytics, analgesics which the patient can tolerate.

The surgical sets we needed were simple surgical set, redivac drain, suction tube, isotonic fluid bags mostly we used normal saline 9%, sometimes use ringer, intravenous giving sets two 5cc syringes, 10 cc xylocaine 1% or 2 %, surgical drawing pen. Preoperative drawing with drawing pen locates and mark the entr point 2.5 cm above and lateral to lateral patellar edge, another exit point marked by drawing pen 2.5 medial and above medial patellar edge (figure 1).

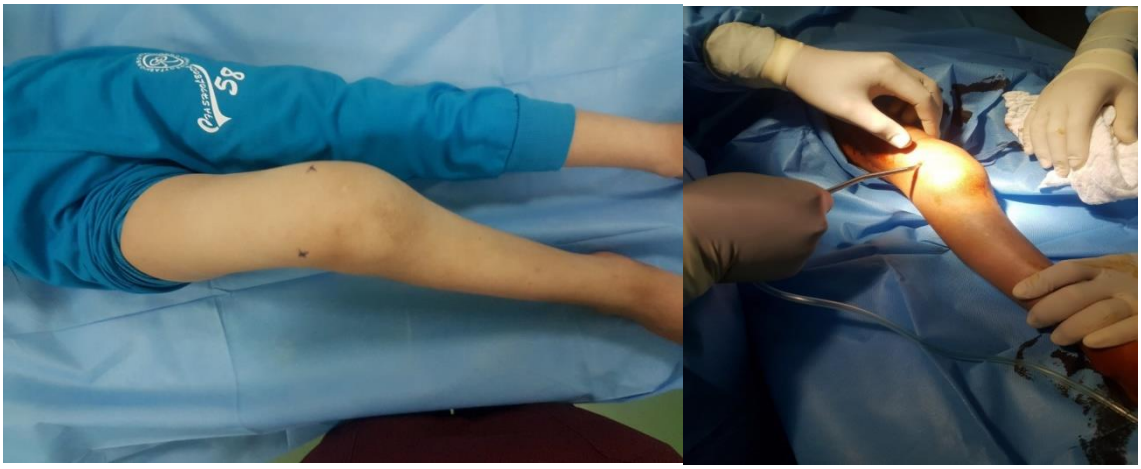

Figure 1 (left) entry and exit points are drawn preoperatively with the patient lying down (right): entry with knife pointing down to avoid injury to quadriceps muscles.

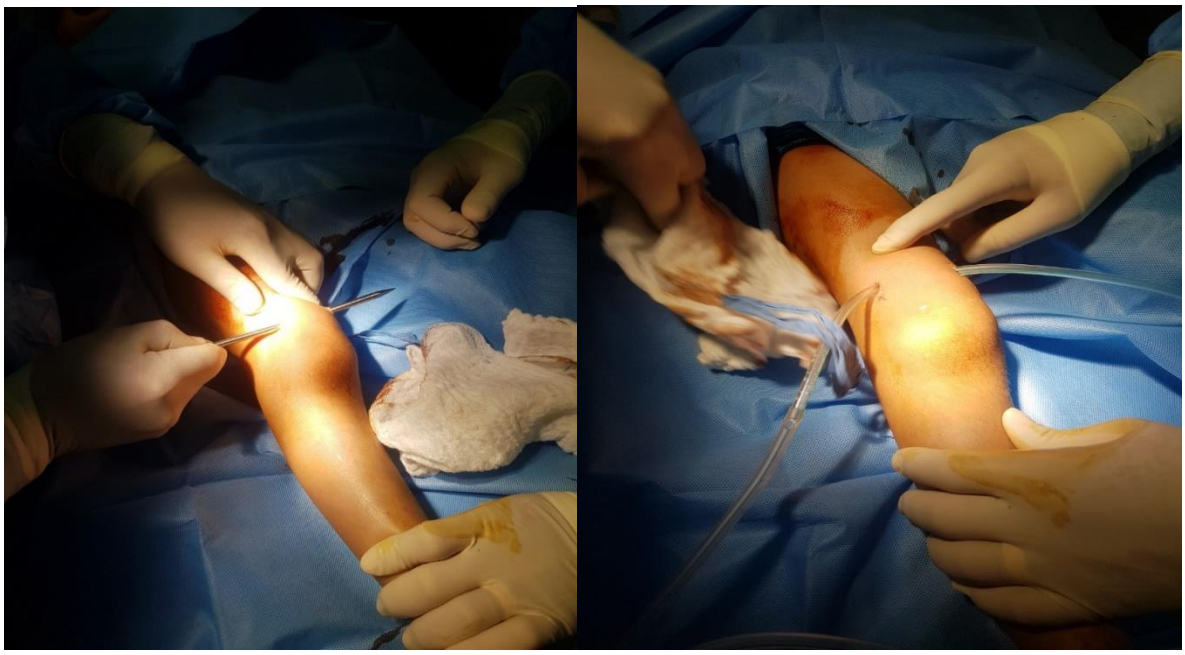

Figure 2 (left) exit of the redivac knife from the exit point notice the knife now 180 up (right) the suction tube and the redivac drain are connected together.

Infiltrate both entry and exit sites with 5cc xylocaine for each this can be done by anesthetist or the surgeon. Stab the entry skin and subcutaneous with redivac knife firstly the tip of the knife pointed down (figure 1). Slowly turned up the knife, once it reaches the suprapatellar pouch turned 90 degree up so it can be pushed safely parallel to suprapatellar quadriceps muscles and the underlying distal femur continue pushing the knife turning it gradually to 180 degree until it reaches the anesthetized exit point in the medial aspect of suprapatellar region. Pullout the knife completely (figure 2).

Withdrew the drain and stop before the hole shoes out. Fenestrate suction tube distal end with scissor making few holes, then connect redivac tube with distal end of suction tube (figure 2), and pull them carefully so that fenestrated parts of both tubes are inside the suprapatellar pouch (figure 3). Sometimes we need to widen the entry point with 11 gage blade and sometimes we need to grasp the connection of the tubes by artery forceps to help in introducing them inside the pouch. Suturing of the skin in the entry and exit sites with the tubes to prevent withdrawal and pullout of the tubes (figure 3).

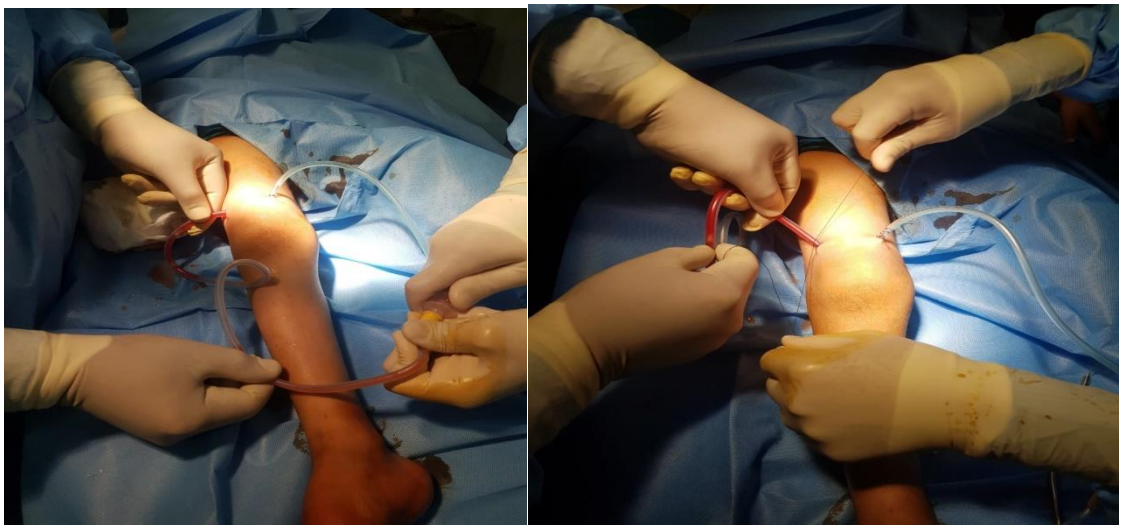

Figure 3 (left) both suction tubes and redivac drain tube are inside the suprapatellar pouch (right) suturing of the entry and exit skin to the tubes

Connect the redivac drain to the isotonic fluid bag using the intravenous giving set tube; the suction tube is connected to collecting urine bag. After first gush of purulent pus a sample of 5 cc pus was collected and send for laboratory investigation, After starting irrigating the joint, the discharging fluid gradually turned from turbid to cleaner fluid. An average of 12 bag of isotonic fluid per 24 hours are used for 3 days. In the following 3 days observe the drainage tubes for any disconnection and follow up the patient clinically and continue systemic antibiotics (Böhler et al., 2016).

3. RESULTS

The patient starts to respond very soon to the drainage, the fever subsided in all 16 patients in the first 24 hour. In the third post-operative day after examining the joint the swelling subsided. The 16 patients were clinically well and improved laboratory investigation discharged to home and continue treatment as a outpatient. The swelling diminished in all the cases The patient start joint movement at day we remove the drain 3 weeks post-operative visit the patients could bend their knees more comfortably

4. DISCUSSION

Surgical treatment include aspiration of the joint (arthrocentesis) and drainage by arthrotomy or arthroscopically. The knee joint is probably the joint that is most amenable to repeated aspirations. Most cases of uncomplicated septic arthritis of the knee can be treated satisfactorily by means of repeated closed needle aspirations (Shapiro, 2016). In a study from Switzerland, 60 patients with septic arthritis (62 affected joints) were treated with a combination of arthroscopic irrigation and debridement (I & D) and antibiotic therapy. The combination of arthroscopic irrigation and systemic antibiotic treatment resulted in cure in 91% of the affected joints (Aïm et al., 2015).

In a study from Austria that included 70 patients with septic arthritis of the knee who were treated with either arthrotomy or arthroscopy, Böhler et al., (2016) reported a significantly lower reinfection rate and a better functional outcome in the arthroscopy group as compared with the arthrotomy group.

5. CONCLUSION

Septic knee arthritis is a serious condition that should be treated as an emergency, Both medical and surgical treatment are needed, Surgical treatment like arthroscopic drainage and local debridement or arthrotomy are used in patients fit for general anesthesia, Redivac drainage and lavage is a very suitable alternative way to treat patients who are unfit for general anesthesia, By redivac drainage and lavage less scar .early joint movement, early rehabilitation and less morbidity can be obtained

Author contribution

Falah Kadhim Hasan: Conception and design of the work, the acquisition, analysis, and interpretation of data for the work, and Drafting the work.

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This study has not received any external funding.

Conflict of Interest

The authors declare that they have no conflict of interest.

Informed consent

Written informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards (Code: 2019/0021).

Data and materials availability

All data associated with this study are present in the paper.

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