



## PROPOSAL FOR A NOVEL DAIR ANTIBIOTIC BASED-PROTOCOL FOR THE TREATMENT OF ACUTE PERIPROSTHETIC JOINT INFECTIONS.

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**BACKGROUND:** Periprosthetic joint infection (PJI) is an increasing complication of total hip and knee arthroplasty, with incidence rates higher than 5%. Debridement, antibiotic and implant retention (DAIR) represent an attractive surgical modality for treatment of PJI, although protocols differ in several retrospective series with a variable success rate (18-100%). Furthermore, randomized controlled or prospective trials on this topic are lacking.

**OBJECTIVES:** Purpose of our study was to validate the efficacy of a specific DAIR protocol for the treatment of acute PJI.

**METHODS:** 18 cases of PJI (hip or knee) were retrospectively enrolled from November 2009 to November 2017 at Santa Maria Maddalena Clinical Institution (Rovigo, Italy). Strict inclusion criteria were considered: acute onset of symptoms (within 3 weeks from the primary implant), fever for less than 3 weeks, absence of immune system impairment (diabetes, rheumatologic diseases, steroid therapies), well fixed prosthetic components, absence of sinus tract. When an infection was suspected, debridement and collection of samples for microbiological, histopathological and physico-chemical with leukocyte count analyses were performed. The proposed DAIR protocol consisted in radical synovectomy, irrigation, tissue debridement arthroscopically performed (Figure 1). Irrigation was carried out with sterile saline solution (5 L) containing a mix with of 200 ml of clorexidine, 500 ml betadine, 500 ml hydrogen peroxide, 2 g vancomycin and 3 g rifampin administered in course of surgery and then repeated using the same volume and concentration during the following 24 hours, for a total of 10 L. Each patient was evaluated by a multidisciplinary team and treated with an appropriate antibiotic treatment for at least 12 weeks. The infection was considered eradicated if the wound healed without persistent drainage and no residual pain or signs of infection were present.

**RESULTS:** 16 out of 18 patients (89%) achieved eradication of the infection, regardless of bacterial strain, with a median follow up of 5 years (range 9-1 years). Frequency of bacterial strain isolated, fluoroquinolone resistance patterns and outcomes are reported in Table 1.

Two out of 18 patients (11,12%) developed a relapse. In both cases, a methicillin-resistant *Staphylococcus aureus* (MRSA) strain was detected.

**CONCLUSION:** Since PJI are constantly increasing, randomized control trials should be required to approve the best specific protocol for DAIR. To our knowledge, the above presented DAIR protocol was carried out for the first time, resulting safe and effective in the majority of cases, avoiding costs and patient morbidity of a 2-stage revision. The high success rate of our arthroscopic protocol makes it potentially comparable with the open procedure, although comparative prospective randomised trials will be required to validate the most effective strategy.

The 100% rate of resistance detected for fluoroquinolones, reflects the widespread and often inappropriate use of these antibiotics, limiting their use in the treatment of PJI.

As already suggested by other authors, evidence of MRSA infection is a contraindication for performing a DAIR procedure.

ISOLETED STRAIN	% of cases	Resistance to Fluoroquinolones	OUTCOME
<i>Coagulase negative Staphylococci</i>	38,89%	YES	Positive
<i>Staphylococcus aureus (MSSA)</i>	27,77%	YES	Positive
<i>Staphylococcus aureus (MRSA)</i>	11,12%	YES	Negative
<i>Klebsiella pneumoniae</i>	5,55%	YES	Positive
<i>Enterococcus faecalis</i>	5,55%	YES	Positive
Culture negative	11,12%	-	Positive

Table 1: Frequency of bacterial strain isolated, fluoroquinolone resistance patterns and outcome of the reported cases

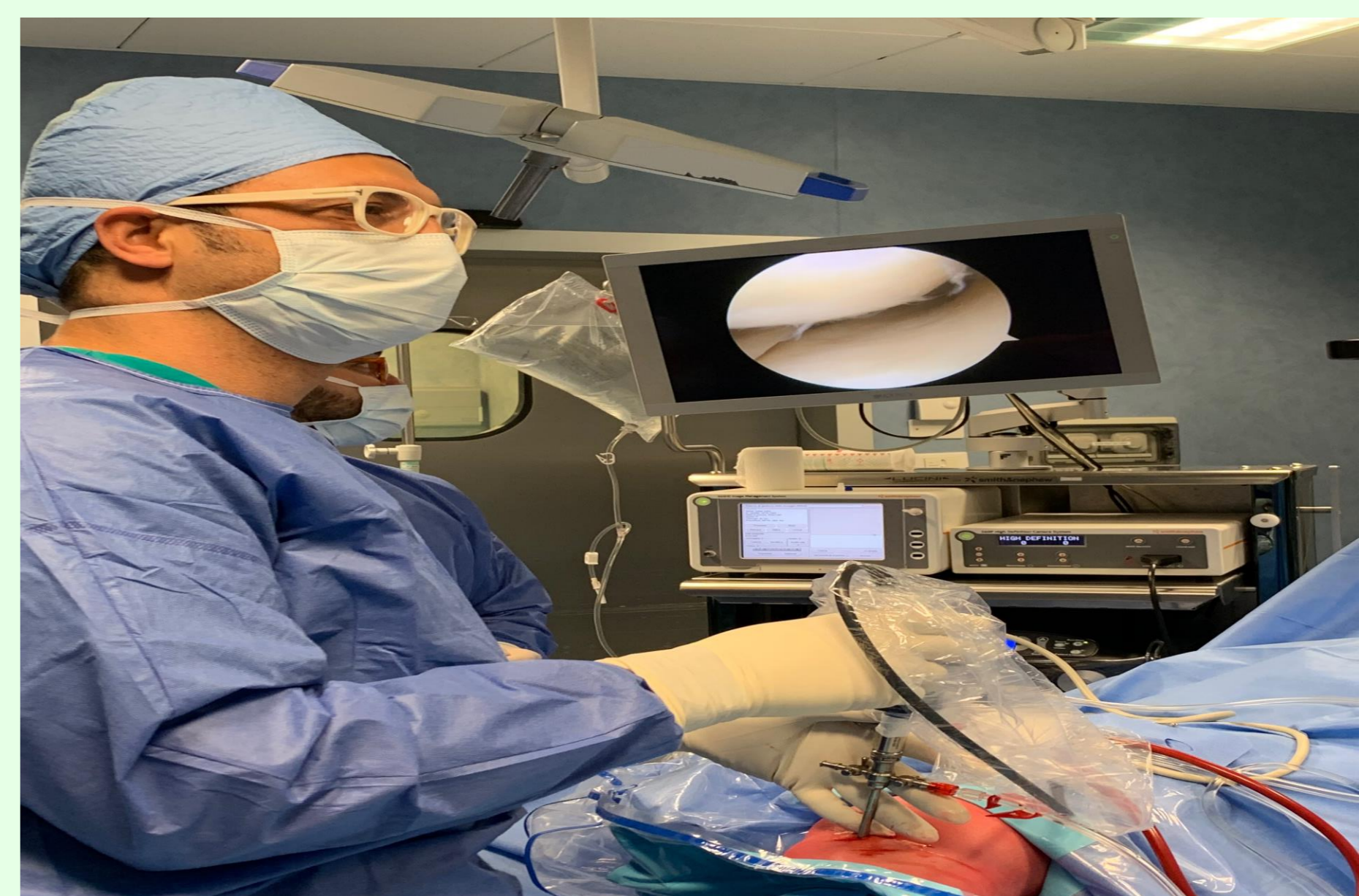


Figure 1: DAIR protocol arthroscopically performed