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Subcutaneous Suppressive Antibiotic Therapy for Bone and Joints Infections: Safety and Outcome in a Cohort of 10 Patients

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Aim

To evaluate treatment modalities, efficacy and safety of subcutaneous (SC) prolonged suppressive antibiotic therapy (PSAT) in patients with chronic prosthetic joint infection (PJI) who can't undergo optimal surgical therapy.
This could be an option for patients infected with resistant pathogens for which oral antibiotics are not suitable.
Subcutaneous administration could be a way to limit catheter-related complications and facilitate ambulatory care.

Method

Prospective cohort study in a tertiary hospital reference center since 2010. **Inclusion criteria:** Adults with bone and joint infection requiring a PSAT, for whom no oral antibiotics are available. Criteria for PSAT: chronic prosthetic joint infection (PJI) or chronic osteomyelitis without optimal surgical therapy, which means no debridement in chronic osteomyelitis; or partial device exchange in patients with chronic PJI

Subcutaneous injection modalities:

Gravity infusion:
- Antibiotic diluted in 50cc of isotonic saline serum
- Using butterfly disposable needle
- Placed alternatively in the anterior face of one thigh or in one abdominal flank
- During 30-45 minutes

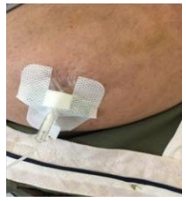
Direct injection:
- Flash SC administration of the antibiotic

Results

- 10 patients, median age of 79 years (IQR 67-90)
- 4 men, 6 women
- 7 PJI (3 hips, 4 knees) and 3 chronic osteomyelitis
- 6 plurimicrobial infections and 4 multidrug resistant Gram negative bacteria
- 2 patients under curative anticoagulation therapy
- 1 patient with a a GFR < 30ml/min and 1 patient was under dialysis
- Suboptimal surgery was performed in 7 patients, and 3 received only antibiotics
- All patients received an induction treatment with intravenous antibiotics
- Used antibiotics, with initial dosage:
  - Ertapenem (n=7), 1 to 2 g/day
  - Ceftriaxone (n=2), 1g/day
  - Ceftazidime (n=1), 2g/day
- The dose was adjusted depending on the results of residual blood concentration of each antibiotic
- Gravity infusion in 9 patients, direct injection in 1 patient
- Median duration of treatment was 6 months (from 1 to 58 months), corresponding to a total of about 5,000 SC injections
- Skin necrosis only in the patient with direct injection

Patient no. (Age)	Pathology	Pathogen	Antibiotic administered SC	Duration	Side effect leading to treatment interruption	Outcome at the last follow-up
1 (78)	Knee PJI	*E. coli* *P. aeruginosa*	Ceftazidime	6 months	None	**Success**
2 (90)	Hip PJI	*Streptococcus spp.*	Ceftriaxone	6 months	None	**Success**
3 (80)	Symphysis chronic infection	*E. coli ESBL*	Ertapenem	58 months	None	**Success**
4 (73)	Sacrum chronic infection	*P. aeruginosa MDR, E. coli ESBL, S. agalactiae, S. aureus, P. mirabilis*	Ertapenem	51 months	None	**Success**
5 (79)	Hip PJI	*E. cloaecae, E. coli*	Ceftriaxone Ertapenem	8 days 6 months	Cholestatic hepatitis Hypereosinophilia	Failure before SC PSAT interruption
6 (67)	Knee PJI	*S. aureus, P. mirabilis, C. koseri, B. fragilis,*	Ertapenem	2 months	Imbalanced epilepsy, drug rash and pruritus	Failure after SC PSAT interruption
7 (75)	Hip PJI	*E. cloacae ESBL, E. faecalis, S. aureus*	Ertapenem	13 months	Non	**Success**
8 (85)	Knee PJI	*M. morganii*	Ceftriaxone	24 months	Skin necrosis	Lost to follow-up
9 (80)	Cotyle chronic infection	*S. aureus, E. faecalis, K. pneumoniae, S. epidermidis*	Ertapenem	5 months	None	**Success**
10 (75)	Knee PJI	*E. coli ESBL*	Ertapenem	1 month	None	**Success**

- **SC PSAT had to be discontinued for side effects in only 2 patients. One patient experienced a relapse despite the SC PSAT.**
- **Finally, SC PSAT was still ongoing in 7 patients with a favorable outcome at the last follow-up.**



Conclusions

- SC PSAT appears to be a safe and effective alternative therapy when optimal surgical strategy is not feasible and when no suitable antibiotic oral treatment is available
- This strategy could facilitate ambulatory care and limit catheter related complications

* Lyon BJI study group

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