

## Prevention of Prosthetic Joint Infection (PJI)

Definition: PJI is a serious complication following joint arthroplasty, characterized by the presence of microorganisms at the implant site, often leading to implant failure.

Once diagnosis of PJI made, patient has a **4x increased odds of mortality** compared to aseptic revisions.

Formation of biofilm (48 hours to 2 weeks) acts like a physical barrier against host defences and antibiotics, some reports up to 1000x more resistant bacteria.

Risk is approximately 0.5-2% of 1° arthroplasties and up to 10% of revision surgeries.

Pathogenesis: Perioperative contamination, hematogenous seeding, or extension from adjacent infections.

### Risk Factors

Patient	Surgery	Microbial load / microbe
Immunosuppression (e.g., diabetes, rheumatoid arthritis, HIV, ESRF, liver disease)	Prolonged surgery duration (>2 hours)	MRSA coloniser
Poor wound healing (smoking, malnutrition)	Type of procedure (revision surgeries carry higher risk)	Previous infections (septic arthritis, presence of implants)
Coagulopathies (anti-coags, bleeding tendency)	Use of drains	Bacterial colonisation distally (wet wounds)
Obesity (BMI >30)	Inadequate sterilization techniques	UTI, poor dentition

Preventive measures:

### Preoperative

Optimise	Screen	Stop	Counsel	In ward
BMI	Exogenous steroids	Smoking	ESRF	Decolonise (hibiscrub night before and morning of surgery)
HbA1C (<8%)	Traditional meds	Alcohol	Chronic Liver Disease	clip hairs at incision and dressing sites (on table)
nutrition	MRSA (decolonise if needed)	Immunosuppresants (see latest ACR guidelines)	IVDU	
• albumin >39mg/L	UTI only screen if symptomatic	Rough: continue all DMARDs, biologics omit 1 dose prior to surgery	HIV	
• normal Hb	Vit D insufficiency	Prednisone < 7.5mg OD		
• total lymphocyte counts >1500 cells/mm <sup>3</sup>				
• transferrin > 200 mg/dL				

ACR = American College Rheumatologist

## Intra-op

Prophylaxis	Environment	Surgery	Implant Selection
<p>Before incision (fat penetration)</p> <p>Cefazolin 1<sup>st</sup> choice substantial evidence excellent bone, synovium, muscle penetration</p> <p>alternative only in TRUE penicillin allergy test dose should be given (5% cross- sensitivity)</p> <p>weight-based dosing and re- dosing long surgeries or major blood loss</p> <p>Vancomycin MRSA carriers high risk patients (given 2 hours before incision)</p> <p>antibiotic duration: 24 hours</p> <p>TXA reduces blood loss i.e. haematoma formation, lessen transfusion risk</p>	<p>Laminar airflow</p> <p>Strict aseptic techniques</p> <p>minimal OR traffic</p> <p>Proper surgical attire for all personnel (surgical helmets weak evidence)</p> <p>Prep: Combination with alcohol solutions (CHG / PVP-I) has best evidence of anti-sepsis</p> <p>iodophor based incise drapes: slow release of iodophor prevents skin recolonisation</p> <p>open trays as late as possible</p>	<p>Proper positioning minimize tissue damage good haemostasis</p> <p>potential contamination from:</p> <ul style="list-style-type: none"> <li>• light handle</li> <li>• skin blade</li> <li>• suction tips (after 1 hr)</li> <li>• gloves (perforated, after 90 mins, after cementing)</li> </ul> <p>Irrigation removes contaminants and non-viable tissues</p> <p>antibiotic- impregnated cement high-risk patients</p>	<p>familiar with one system reduce surgical time</p> <p>ceramic bearings lowers risk of bacterial attachment = biofilm formation</p> <p>*** dressings Occlusive dressing with alginated hydrocolloid</p>

## Post-op

Wound care	Transfusion	Catheters and drains	Educate
<p>Ensure wound dry</p> <p>Persistent wound drainage (see reference)</p> <p>Albumin supplements</p> <p>Off anti-coags</p> <p>Bandaging</p> <p>Reduce ROM</p>	<p>Allogeneic transfusion increases risk of post-op infections</p> <p>Optimisation of pre- op Hb</p> <p>Use of TXA adjuncts</p>	<p>Remove foleys as soon as possible (upon patient ambulation)</p> <p>Drains remove once reduced below 50mL/day (avoid drain if possible)</p>	<p>Inform patients what to watch out for</p> <p>Diabetics: Keep post-op glucose below 10mmol/L (esp 1<sup>st</sup> 24-48 hours)</p>

**Emerging / Controversial:**

Extended antibiotic prophylaxis

Intra-osseous vancomycin

Silver coated implants

**Further reading:**

ICMphilly 2018, General Assembly

<https://icmphilly.com/wp-content/uploads/2018/11/General.pdf>

Guidelines for the Prevention of Prosthetic Joint Infection, Joint Reconstruction Unit, UMMC

Zmistowski B, Karam JA, Durinka JB, Casper DS, Parvizi J. Periprosthetic joint infection increases the risk of one-year mortality. J Bone Joint Surg Am. 2013 Dec 18;95(24):2177-84. doi: 10.2106/JBJS.L.00789. PMID: 24352771

Wagenaar FBM, Löwik CAM, Zahar A, Jutte PC, Gehrke T, Parvizi J. Persistent Wound Drainage After Total Joint Arthroplasty: A Narrative Review. J Arthroplasty. 2019 Jan;34(1):175-182. doi: 10.1016/j.arth.2018.08.034. Epub 2018 Sep 3. PMID: 30245124.