Guidelines to be followed by centres, services and units in order to be designated as Reference Centres, Services and Units of the National Health System, as agreed by the Interterritorial Board

26. RESISTANT OSTEOARTICULAR INFECTIONS TREATMENT

Osteoarticular infections are an important therapeutic problem, which in some cases leads to limb amputation or even the patient's death. Three major groups are distinguished: primary infections (arthritis and osteomyelitis), post trauma infections (especially after open fractures) and prosthetic joints infections.

Initial treatment consists of antibiotherapy, with or without surgical drainage. This can be effective in acute prosthetic infections (recovery rates of up to 80-100%[1]). Development of new antibiotics has allowed effective treatment of osteomyelitis and infected arthroplasty[6,7].

Chronic cases require prosthesis replacement. Typically replacement in two steps is preferred, initial removal of the infected prosthesis and antibiotic administration during a few weeks, and prosthesis replacement during the second step, with success rates of up to 95%; nevertheless, some research show successful results with replacement in one step[2,3,4].

Knee arthrodesis usually is the last resort for salvage of the limb in cases of infection resistance after prosthetic revision. By using modular intramedullary nails arthrodesis rates of 85-100%[5] have been achieved, except for cases with severe bone loss.

Nowadays, there are new therapeutic innovations whose real effectiveness is worth to assess from a scientific perspective: new antibiotics, morphogenetic proteins (BMP), etc.

Referral to a Reference unit for treatment of resistant osteoarticular infections would be indicated for patients showing:
- Primary infections: chronic osteomyelitis resistant to medical and surgical treatment.
- Post trauma infections: Open fractures, with secondary infection, with bone and/or skin cover loss, where treatment to the infection source has not been effective.
- Articular prosthesis infections where there has been at least a replacement in the source and the infection has not been controlled.

A. *Rationale for the proposal*

► Epidemiological data on resistant osteoarticular infections (incidence and prevalence).	Actual incidence of open fractures is difficult to know[8]. In inferior limbs the most frequent are tibial diaphyseal fractures (21.6%) which are also the most severe (54% are Gustilo type III[8]). Infection rate in type III fractures is 10-15% (tibia fractures have an infection rate 10-20 times higher). Infection incidence after arthroplasty is variable depending on the research, fluctuating from 0.3 to 23%[9], being in general considered of 1.5% in total hip replacement (THR) and of 2.5% in total knee replacement (TKR)[10]. In Spain around 30,000 prosthesis are placed in a year (especially for knee and hip) and in the world more than one million per year[1]. According to this data, 600 infected prostheses are expected per year in Spain. Economical cost of infected arthroplasty is very high. In USA the average cost of care for a patient with infected TKR is estimated to be around 50,000 dollars[9].

B. Guidelines to be followed by Centres, Services and Units in order to be designated as Reference Centres, Services and Units for performing resistant osteoarticular infections treatment

► Experience of the Reference Centres, Services and Units: - Activity: • Number of procedures that should be performed in a year to ensure an adequate care of resistant osteoarticular infections.	 - A monthly average of 6 complex surgeries (arthroplasties, prosthetic replacements, septic pseudarthrosis…) or 72 in a year in patients with resistant osteoarticular infections susceptible of being treated in a Reference Centre, Service and Unit of the National Health System: Chronic osteomyelitis resistant to medical or surgical treatment; open fractures, with secondary infection, with bone and/or skin cover loss, where treatment to the infection source has not been effective; articular prosthesis infections where there has been at least a replacement in the source and the infection has not been controlled.
- Other data: research on the subject, postgraduate teaching, continuing training, etc.	- Accredited postgraduate teaching: unit participation in the internship and residency programme of the centre.

	- Participation in research projects and publications in the field[a]. - Continuing training programme standardized, and authorized by the centre board of directors.
► Specific resources of the Reference Centres, Services and Units:	
- Human resources required to guarantee the adequate performing of resistant osteoarticular infections treatments.	- Surgeon team coordinator. - 2 surgeons specialized in orthopaedics and traumatology. - Nursing staff, surgical auxiliaries and technicians.
- Basic education of the team members[b].	- At least, 2 surgeons in the team with a minimum experience of 3 years in the treatment of septic osteoarticular pathology. - Surgeons with experience in hip and knee primary arthroplasty and in non-septic prosthetic replacement. - Nursing staff, surgical auxiliaries and technicians with experience in articular replacements.
- Equipment required for the adequate treatment of resistant osteoarticular infections.	- Full range of surgical instruments for prosthetic and revision surgery. - Cement extraction instruments. - Metal cutting power saw. - Image intensifier. - Specific hospitalization area for patients with septic osteoarticular pathology.
► Resources from other units and services besides those belonging to the Reference Centres, Services and Units required for the adequate treatment of resistant osteoarticular infections.	- Anaesthesia services/unit. - Intensive care services/unit. - Plastic and reconstructive surgery services/unit. - Rehabilitation services/unit. - Radiodiagnosis services/unit, including CT scan. - Microbiology services/unit. - Nuclear medicine services/unit. - Transfusion services. - Bone bank available.

► Procedure and clinical results indicators of the Reference Centres, Services and Units [c]:	**The indicators will be agreed with the Units that will be designated.**
► Existence of an adequate IT system (Type of data that the IT system must include to allow identification of the activity and evaluation of the quality of the services provided)	- Filling up the complete MBDS of hospital discharge. - The unit must have a *registry of patients* who have been admitted with a resistant osteoarticular infection which at least must include: - Medical record number. - Date of birth. - Sex. - Admission date and discharge date. - Circumstances of the discharge (home, hospital transfer, voluntary, death, transfer to a healthcare centre, other.) - Main diagnosis (ICD-9-CM). - Secondary diagnosis (ICD-9-CM). - Number and type of therapeutic procedures provided to the patient (ICD-9-CM): • Prosthetic replacement. • Other therapeutic procedures. - Date of prosthetic replacement. - Diagnostic procedures provided to the patient (ICD-9-CM): - Complications (ICD-9-CM): • Intraoperative. • Postoperative. - Follow-up - The unit must have the required data which should be sent to the Spanish National Health Service Reference Centres, Services and Units Appointment Commission Secretariat for yearly reference unit monitoring.

[a] *Criteria to be assessed by the Appointment Commission.*
[b] *Experience will be accredited by certification from the hospital manager.*
[c] *Clinical results standards, agreed to by the experts group, will be assessed, initially by the Appointment Commission, while in the qualification process, as more information from the Reference Centres, Services and Units is being obtained. Once qualified by the Appointment Commission, the Quality Agency will authorize its compliance, as for the rest of guidelines.*

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