Metallosis in orthopaedic practices

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In relation to metalic implant materials ,the biocompatibility ofimplant metals is of considerable concern because they can corrode in thehostile body environment.The consequences of corrosion include loss of material, which will weaken the implant, and probably more important,that the corrosion products escape into tissue, resulting in undesirableeffects. of the body reacting to a metal implant. The immune system sees this device as foreign. It mounts a defense against the prosthesis (implant) and tries to rid itself of it. Inflammation and scarring around the implant are the result. The mechanism of metallosis is when the metallic wear particles are released, they give rise to at least three types of effects : I, these particles can be fragmented into smaller-sized components with overall larger surface area leading to increased toxicity at the particle–host tissue interface .II , particles with suitable size can be directly phagocytosed(mainly by histiocytes) leading to local -inflammatory reaction with giantcell infiltration. This may activate an osteoclast mediated bone resorptionand osteolysis.Metallosis was found be associated with periprostheticosteolysis in 77.4% of cases.III, some of the phagocytosed (and may befree) particles migrate to local lymph nodes, spleen, liver, and lungs.While the effect of this phenomenon on remote organs is still controversial, local necrosis and fibrosis can be encountered . The effects of metallosis are :(1) Bone destruction : in form ofosteolysis ,(2) soft tissue destruction : Periprosthetic metallosis is a pathologic diagnosis made at the time of surgery. The extent of bone andsoft tissue destruction can be underestimated by routine analysis ofpreoperative radiographs , (3) Fracture , (4) Loosening of implant andfinal result is failure of implant : The most common cause of long-termfailure of THA is osteolysis and aseptic loosening ,(5) histopathologicaleffects :accumulation of metallic debris and tartrate-resistant acidphosphatase-positive cells around the trabecular and cortical bone . The diagnosis of metallosis is made by knowing I : Clinical picture : Important symptoms and signs :pain , swelling , tenderness , limited movements, metallosis is a rare cause of delayed neurologic symptoms after spinal instrumentation surgery.Intraspinal metallosisshould be kept in mind as a rare cause of delayed neurologic symptomsafter spinal instrumentation surgery. II : Investigations :A-imagingappearances of mrtallosis :(1) x-ray :Radiographically, metallosis canbe -seen as a radio-dense line, described as “the bubble sign” by Su et al. and as metal line sign by Weissman et al. Moreover, it can resembleheterotopic ossification. A more consistent but less specific radiographic finding in patients with histologically proven metallosis is osteolysis around the prosthetic components.(2) Computerized tomography (CT) ,(3) Magnetic resonance imaging (MRI) , (4) Myelography: With

themetal implants in place, myelography was the sole informative examination for diagnosis . B- Histopathological examinations ,C – Activation analysis :Instrumental neutron activation analyses have beencarried out on tissues adjacent and distant from metal implants, D –LABORATORY INVESTIGATIONS .III : Differential diagnosis : (1) Heterotopic ossification :Theplain radiographic features of metallosis can be difficult to distinguish from HO, particularly when both processes are present. Layering ofmetallic debris around the pseudocapsule of the joint can mimic theperipheral cortical calcific opacity of HO when projected onto a 2-dimensional image.However, CT, with multiplanar reformats, shouldallow the differentiation of HO, with its clearly demarcated cortex andmedulla, from the diffuse amorphous increased attenuation caused bymetallosis .(2) Immune response to implants [metal sensitivity]:Gradual development of skin changes, pain, tenderness, and swellingover the area of the implanted hardware may be coupled with evidenceof loosening of a previously stable implant . The treatment of metallosis is : Revision surgery (secondsurgery) : which is necessary to stop further shedding of metallicparticles into the body (in this surgery the implant is removed andreplaced with bone grafts and |or another device) . Once the offendingimplant is removed the levels of cobalt and chromium levels in the bloodwill start to DROP. However the immune system may well show a heightened sensitivity to lower levels of these metals in the future.