Complications of Metal on Metal Resurfacing Hip Arthroplasty

Essay for the partial fulfillment of niaster degree in orthopedic surgery

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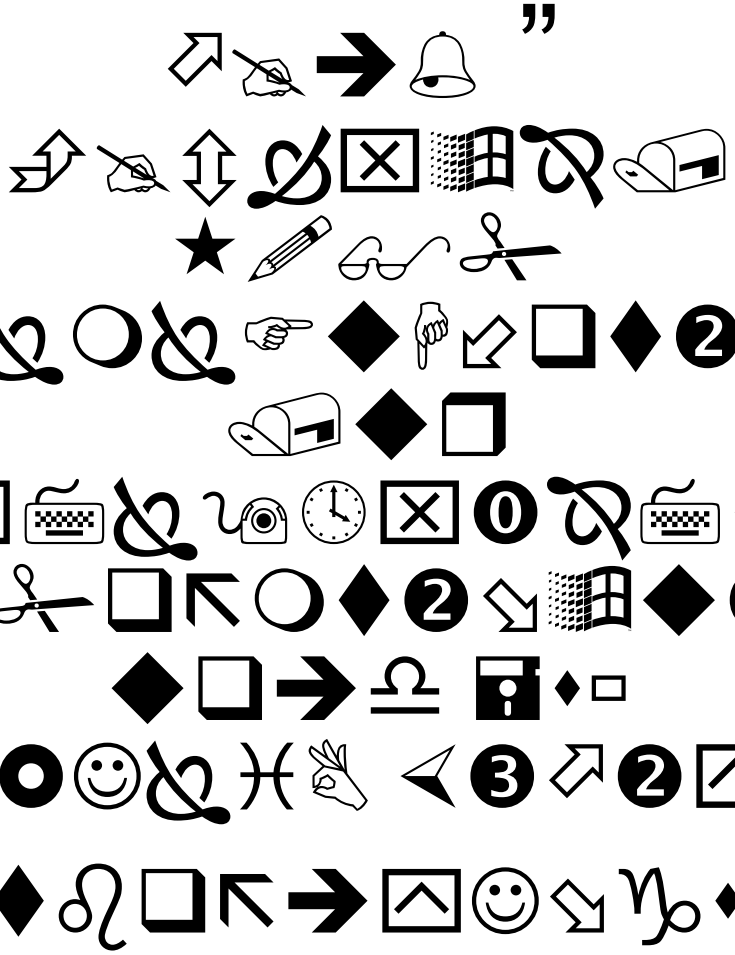

صدق الله العظيم

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LIST OF ABBREVIATIONS

AVN	**:**	Avascular Necrosis
ARDM	**:**	Adverse Reaction to Metal Debris
BHR	**:**	Birmingham Hip Resurfacing
CI	**:**	Confidence Interval
HDP	**:**	High Density Polyethylene
HO	**:**	Heterotopic Ossification
M-o-M	**:**	Metal on Metal
M-o-M RHA	**:**	Metal on Metal Resurfacing Hip Arthroplasty
OA	**:**	Ostearthrosis
RHA	**:**	Resurfacing Hip Arthroplasty
ROM	**:**	Range Of Motion
SARI	**:**	Surface Arthroplasty Risk Index
THA	**:**	Total Hip Arthroplasty

INTRODUCTION

Resurfacing of diseased hip joints attracted orthopedic surgeon in the past. It preceded the use of stemmed arthroplasties.[1] Resurfacing (mold) arthroplasty was implanted by Smith-Petersen 1940s. The poor results and the appearance of total hip stemmed solution with the introduction of polyethylene rapidly replaced the resurfacing arthroplasty.[2]

The resurfacing concept was reintroduced in 1970s with metal on polyethylene implants. It became very popular especially in Europe. But the high failure rate due to osteolysis associated with the high wear rate and the reaction to large wear particles of polyethylene, let this generation of resurfacing fell out in 1980 in favor of Total Hip Arthroplasty (THA).[1, 2]

Offering better performance for young adults with end stage hip osteoarthrosis has been still an ambition to orthopedic surgeons. In 1990s, the improved engineering and manufacturing devices allowed the reintroduction of resurfacing hip arthroplasties using low wear metal on metal bearings. It was not until 1996 that the contemporary implant models have been used with a hybrid fixation technique.[2, 3]

The new generation of Metal-on-Metal Resurfacing Hip Arhtroplaty (M-o-M RHA) gathered the advantages of Metal-on-Metal bearings and large diameter hip arthropalsty. Offering stable and painless hip joints that permit the return to preoperative activity level through a relatively bone stock sparing procedure, made resurfacing a very evolving alternative especially after the publication of the medium term results of resurfacing pioneers.[2, 4-7]

Over a short period of time, resurfacings became very popular and the number of resurfacing implants increased to about 10% of all primary hip replacements in countries such as the UK, Australia, and the Netherlands.[4, 8]

In front of the higher incidence of failure in the multicenter series, a decline in the resurfacing was remarked in the Australian registry of AOA from 2006 to 2008. The English registry as well reported this decline.[9-11]

The future of resurfacing depends on the understanding of reported complications and devising concrete measures to reduce them.

The purpose of our study is to review reported complications associated with Metal-on-Metal Resurfacing Hip Arthroplasty and various measures proposed by authors to overcome them.

We will present a comprehensive review of reported complications associated with M-o-M RHA. We will discuss reported risk factors (technical and patient related). Our study will also discuss potential long term complications which are still the subject of debate.

Finally we will show various measures proposed in the literature to overcome reported complications.

AIM OF THE WORK

Discussing complications associated with metal on metal resurfacing hip arthroplasty and measures to overcome them

THE REVIVING OF THE RESURFACING CONSEPT BY THE METAL ON METAL BEARING

Hip resurfacing is a type of hip replacement where the femoral implant caps the femoral head, thus preserving the bone of the proximal femur.

The surgical approach is the same of the conventional hip replacement but with more dissection to allow mobilization and preservation of the femoral head to visualize the acetabulum.

In resurfacing, the capped femoral head articulates either with the acetabular cartilage (Hemiarthroplasty) or with an acetabular component.[1]

The reviving of the resurfacing arthroplasty in 1990s was the result of renovation in the design of the prosthesis, the development of perfectly bearing metal alloys and the understanding of the fluid lubrication and optimal clearance in large diameter femoral component in metal on metal arthroplasty.[2]

History

The use of resurfacing prostheses predates the use of stemmed femoral component.

Back in 1930s-1950s, various materials like ivory, glass and stainless-steel were used.[1]

The first generations of resurfaced hip joints.

Contemporary designs of resurfacing have evolved directly from the original mold arthroplasty introduced by Smith-Petersen in 1948 which was a hemiresurfacing.[12] **Fig.(1)**

The first total resurfacing arthroplasty was developed by Charnley in the early 1950s using a Teflon-on-Teflon bearing. This implant was associated with high rate of early failure. Avascular necrosis was first accused but subsequently the poor wear characteristics of the Teflon were recognized.[13, 14]

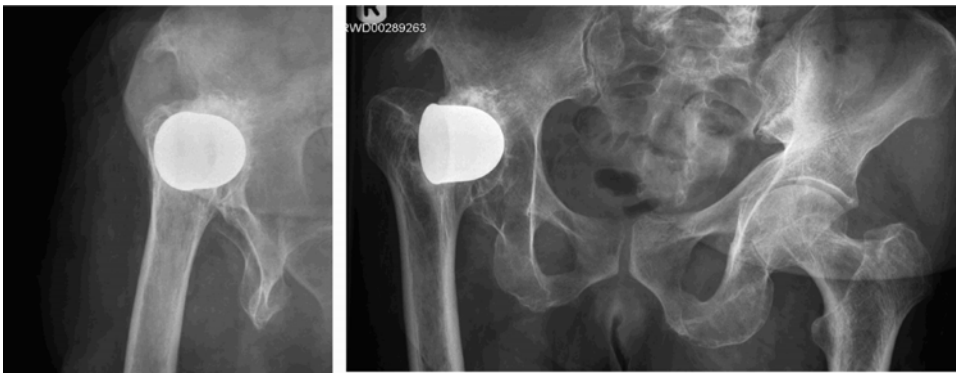

Fig.(1) : Smith-Peterson Vitallium mold arthroplasty 58 years post-operative.[15]