Metalwork Fracture Following Total Hip Arthroplasty

Corresponding Author:
Dr. Stephen R Manning,
Clinical Fellow, Medical Education. Sandwell General Hospital, WS5 4SJ - United Kingdom

Submitting Author:
Dr. Stephen R Manning,
Clinical Fellow, Medical Education. Sandwell General Hospital, WS5 4SJ - United Kingdom

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Author(s): Manning S R

Abstract

Herein is presented a case of an unusual injury following a total hip replacement. Many of us would consider the metal implant to be the strongest, most resilient part of a hip joint after replacement. This may not always be the case, as the following case illustrates, metal may break when force is applied leaving the bone intact.

Case Report(s)

A 66 year old lady had undergone a right total hip replacement some 4 weeks earlier. She had been recovering well and was at home mobilising with the aid of crutches. Her medical history was of diabetes, controlled with metformin. She is a non-smoker who lives in a house with her husband. She had been managing the stairs safely on her crutches. Of note, is that she is a lady of considerable size with a BMI of 40. She presented to casualty unable to flex or extend her right hip after falling off a small step in her garden, landing on her right hip. It was not particularly painful. The hip was held in flexion of 10 degrees. Her surgical wound was healed. She had not sustained any other injury.

An AP radiograph of the pelvis was taken to look for dislocation or peri-prosthetic fracture. (figure 1).

The radiograph however, did not show either of these conditions. Instead, a break in the metal of the femoral prosthesis was seen. The impact from the fall had snapped and bent the femoral neck. The bone was intact and the femoral head was sitting in the acetabulum.

This lady was admitted to hospital under the care of the orthopaedic surgeons and a revision of her femoral component was carried out, from which she recovered well.

Discussion

Dislocation was considered as a differential diagnosis. Andrew et al., (2008) looked at hip replacement surgery in the obese patient and found that there was no significant difference in the rates of dislocation between the non-obese, obese and morbidly obese patient (1.3, 2.7 and 5.6% respectively) Dislocation due to trauma is described by von Knoch et al., (2002) as a cause of late dislocation (median time 11.3 years post operation) however it is associated with substantial trauma. Khan et al., (1981) also looked at dislocations and identified 142 patients with dislocation after hip replacement. Just 10 of these clearly resulted from trauma and again, were late dislocations. From the literature available dislocation would be uncommon after a fall 4 weeks post operatively, and the evidence suggests the risk of dislocation was not increased by her body mass.

Periprosthetic fracture is an uncommon but important complication of cemented total hip replacement. Cook et al.,(2008) have shown that the incidence of fracture at 5 years post surgery is 0.8% and at 10 years post surgery is 3.5%. The only risk factor for peri-prosthetic fracture identified was age over 70 years. This correlated with the work of Lindahl et al., (2006) who identified an average age of 73.9 years for patients suffering periprosthetic fractures. They found that minor trauma, such as a fall from standing or spontaneous fracture were the most common causes but also that 66% of those suffering fracture after primary hip replacement had some evidence of implant loosening. Neither of these studies identified any metal work fractures. The patient described here certainly had a fall that could be classed as minor trauma, however, allowing for her body mass the impact onto the hip would be expected to have been higher than that experienced by a person of lesser body mass. She is below the average age seen in the described studies and at 4 weeks post op there is no evidence of implant loosening. It would seem that peri-prosthetic fracture would be an unlikely finding in this patient.

Busch et al., (2005) identified 5 metal work fractures out of a series of 219 revision hip procedures using a cementless system. Risk factors for metalwork fracture in this series were identified as BMI >30, poor proximal bone support, extended trochanteric osteotomy, and small stem diameter. Although this patient had not undergone a revision hip replacement it would be reasonable to consider her BMI to be a risk factor for fracture of the metal femoral prosthesis she was given.

It is worth considering the offset used in placing this prosthesis. As offset increases so too does stress through the femoral prosthesis neck. The level of stress placed upon this prosthesis therefore would be greater with an increased offset and greater still in this
patient due to her increased BMI.

From the literature available, it seems that fractures of the femoral component of a cemented total hip replacement are a very rare event, but are associated with having a higher BMI unlike dislocations or peri-prosthetic fractures.

Conclusion

Peri-prosthetic fractures after hip replacement surgery are not common and tend to occur after minor trauma in older patients with loosening of the prosthesis. Dislocations are more common but are not associated with trauma until later and are not associated with higher body mass.

Metalwork fractures after total hip replacement are rare but do happen.

Consider this diagnosis in the larger patient suffering trauma to a prosthetic hip joint. Remember to inspect the metalwork seen on radiographs as well as the bones.

References

Illustrations

Illustration 1

Figure 1: AP radiograph of the pelvis
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