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## Original Article

# Revision of failed hip hemiarthroplasty. Classification, management, and follow-up

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## ABSTRACT

**Background:** Many types of failed hemiarthroplasties have been reported, but there is no classification of these failures.

**Patients and methods:** Revisions of 217 cases of failed hemiarthroplasty were studied with an average follow-up of 6.2 years. Classification system based on site of problem, mode of failure, and type of revision, was introduced.

**Results:** In most cases, the intra-operative assessment of failure correlated with the preoperative classification (99%). At the last follow-up, there were 15/217 re-revisions; giving a success rate of 93%.

**Conclusion:** This classification helps in choosing the appropriate revision method, leading to acceptable results.

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## 1. Introduction

Conversion of failed hip hemiarthroplasty (bipolar or unipolar) to total hip replacement (THR) represents an orthopedic challenge. Hip hemiarthroplasties are less invasive operations in that only one side of the joint is replaced, preserving bone stock for future THR procedures. On failure of these operations, a THR is indicated but the effect of these implants on the operative procedures and long-term outcomes of a subsequent THR has been debatable and not clear.<sup>1,2</sup> The conversion of failed hip hemiarthroplasty to THR has been associated with high rates of intra- and

postoperative complications.<sup>3,4</sup> However, clinical experience has defined specific recurrent patterns of failure of hip hemiarthroplasty,<sup>5,6</sup> but there is no classification of these failures. By determining the site (whether acetabular or femoral or both) and the mode of failure, the surgeon can determine the type of revision and develop a rational plan for treatment. Based upon these criteria in 217 failed hip hemiarthroplasties, a systemic approach has been developed to classify these revisions. These cases were revised and were reviewed clinically and radiographically after a minimum of 4 years. This study outlines this classification system and proposes treatment options for each type of failure.

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## 2. Materials and methods

During 1997–2009, 217 patients underwent revision of failed hemiarthroplasty to THR by or under supervision of the senior author with an average follow-up period of 6.2 years (range 4–13 years). Patients, who did not have a minimum follow-up of 4 years, were excluded from the start. There were 101 men and 116 women with an average age of 59.4 years (range, 54–79 years). The average time since primary surgery was 84 months (range 4–132 months). Pre-operative Harris Hip Score (HHS) ranged from 15 to 62, with an average of 36. The average pre-operative shortening was 2.3 cm (range 0–4 cm). Antero-posterior radiographs of the pelvis, antero-posterior and lateral radiographs of the affected hip with thigh were obtained. Before surgery, each patient was evaluated clinically and radiographically and classified as types I–V.

### 2.1. Failed hip hemiarthroplasty classification

The hip revision classification system is based upon site and mode of failure. Revisions are classified by type, indicating

whether the problem in the acetabulum or femur or both; whether the revision will be in one or two stages; whether the revision will need bone graft or not; and finally indicating the type of prostheses required (Table 1). The revision types were divided into subtypes that corresponded to different types of hemiarthroplasties, and different modes of failure.

#### 2.1.1. Type I: acetabular problem

This type displays an acetabular problem (most of them are protrusion), and a well fixed stable femoral prosthesis. It is divided into two subtypes according to type of femoral prosthesis. Type IA failure has a monoblock femoral prosthesis; either cemented Thompson or Austin Moore. In this subtype, the well fixed femoral prosthesis must be removed, and this usually leads to some bony destruction of the proximal femur. The revision is usually complicated and involves both the femoral and acetabular sides. Type IB failure has a well fixed bipolar femoral prosthesis; so it is not revised, but we shall change the large sized head. Just acetabular protrusion has to be managed.

**Table 1 – Hip hemiarthroplasty classification system depending on site of problem, mode of failure and method of revision.**

Type	Site of problem and mode of failure	Method of revision				
		One or two stages	Need of bone graft		Type of prostheses	
			Acetabulum	Femur	Acetabulum	Femur
Type I	Acetabular problem; protrusion and Well fixed stable femoral component	One stage				
Type IA	Monoblock femoral prosthesis (Thompson, Austin Moore)		Usually needed	Occasionally needed	Uncemented cup with screws or cup with ring	Long stem or custom-made femoral prosthesis
Type IB	Bipolar femoral prosthesis		Usually needed	Not needed	Uncemented cup with screws or cup with ring	Not revised
Type II	(femoral problem)	One stage				
Type IIA	Aseptic loosening with good bone stock		Not needed	Not needed	Cemented/ Uncemented cup	Standard femoral prosthesis
Type IIB	Aseptic loosening with bone stock loss		Not needed	Usually needed	Cemented/ Uncemented cup	Long stem or custom made femoral prosthesis
Type IIC	Peri-prosthetic femoral fracture		Not needed	Occasionally needed	Cemented/ Uncemented cup	Long stem femoral prosthesis
Type III	Various combinations of both femoral and acetabular problems as in types I and II	One stage	According to the mode of failure as in types I and II			
Type IV	Instability and recurrent dislocation	One stage	Not needed	Occasionally needed	Cemented/ uncemented cup	Long stem or custom-made femoral prosthesis
Type V	(infection)	Two stage	Two stage revision with cement spacer			

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