



Original Article

Is the size of the acetabular bone lesion a predictive factor for failure in revisions of total hip arthroplasty using an impacted allograft?*



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ARTICLE INFO

Article history:

Received 12 August 2015

Accepted 25 September 2015

Available online 27 June 2016

Keywords:

Hip arthroplasty

Bone transplantation

Acetabulum

Allografts

ABSTRACT

Objective: The aim of this study was to determine the acetabular bone lesion size (in millimeters) from which impacted bone graft failure starts to occur more frequently, through simple anteroposterior hip radiographs, and whether measurement of the defect on simple radiographs maintains the same pattern in inter and intraobserver assessments.

Methods: Thirty-eight anteroposterior pelvic-view radiographs from patients undergoing revision of an acetabular prosthesis were retrospectively analyzed and assessed. In the vertical plane, the bilacral line was measured in millimeters from the farthest point found on the bone edge of the acetabular osteolysis to the top edge of the cementation or of the acetabular implant in uncemented cases. The base was taken to be a line perpendicular to bilacral line, with the aim of eliminating any pelvic tilt effects. This measurement was named the vertical size of failure. Radiographs produced four years after the operation were analyzed to investigate any failure of the technique.

Results: The graft failure rate in the study group was 26.3%. The failures occurred in cases with an initial bone defect larger than 11 mm. No cases with measurements smaller than this evolved with failure of the revision. The highest incidence of graft failure occurred in cases described as advanced according to the "Paprosky" classification.

Conclusion: Failure of acetabular revision arthroplasty using an impacted graft did not present any statistically significant correlation with the vertical extent of the lesion on simple anteroposterior radiographs, as a predictor of treatment failure.

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<http://dx.doi.org/10.1016/j.rboe.2015.09.015>

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O tamanho da lesão óssea acetabular é fator preditivo para a falha nas revisões de artroplastia total do quadril com enxerto impactado?

RESUMO

Palavras-chave:

Artroplastia de quadril
Transplante ósseo
Acetáculo
Aloenxertos

Objetivo: O presente trabalho buscou, através de uma radiografia simples anteroposterior do quadril, quantificar em milímetros a partir de qual tamanho da lesão óssea acetabular ocorre com maior frequência falha do enxerto ósseo impactado e se a medição do defeito nas radiografias simples mantém o mesmo padrão na avaliação inter e intraobservador.

Métodos: Foram analisadas e aferidas retrospectivamente 38 radiografias de pacientes submetidos à revisão de prótese acetabular na incidência anteroposterior de bacia, mensurando em milímetros, no plano vertical a linha bilacrimal, a medida entre o ponto mais distante encontrado na borda óssea da osteólise acetabular, com a margem superior da cimentação ou implante acetabular nos casos não cimentados. Tomamos como base uma linha perpendicular a linha bilacrimal com o intuito de eliminar efeitos de inclinação pélvica. Essa medida foi denominada Tamanho Vertical da Falha. Radiografias pós-operatórias com quatro anos foram analisadas para averiguar falha da técnica.

Resultados: No grupo estudado observamos 26,3% de falhas do enxerto que ocorreram a partir de 11 mm de tamanho da falha óssea inicial mensurada e que abaixo desse valor nenhum caso evoluiu com falha da revisão. A maior incidência da falha do enxerto ocorreu nos casos avançados segundo a classificação de Paprosky.

Conclusão: A falha na artroplastia de revisão acetabular com enxerto impactado quando relacionado à medida vertical da lesão em radiografia simples anteroposterior do quadril não apresentou significância estatística como fator preditivo de falha do tratamento.

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Introduction

The consolidation of contemporary total hip arthroplasty techniques has resulted in an increase in the use of this procedure. Therefore, the need for revision surgery has become a more common problem.¹

The restoration of the anatomy and biomechanics improves durability and function of the revised hip. The most challenging aspect of acetabular revision is to compensate for acetabular bone loss and create a stable reconstruction, with good long term durability.²

Various techniques are described to rebuild extensive acetabular defects, including structural grafts or impacted graft chips, reinforcement rings with cages, placement of the acetabular component in a high hip center, jumbo acetabular cups, bilobed acetabular cups, triflange cups, and trabecular metal acetabular augments.²

Although more modern prosthesis revision techniques are available, associated with new implants, this procedure remains a challenge, even for more experienced surgeons.³

The loosening of cemented or cementless components in total hip arthroplasty is always accompanied by loss of bone stock. Sloof et al.⁴ proposed the use of impacted bone graft in revisions of this component when bone loss was significant.

Acetabular reconstruction with impacted bone graft and a cemented cup is a reliable technique, with a ten-year survival rate of 88% in patients with extensive acetabular defects.² Bone loss can be determined by the classification of Paprosky et al.,⁵ which provides a simple algorithm to determine bone

defect and direct treatment for revision in total hip arthroplasty.

Brown et al.,⁶ in a study that used the Paprosky classification, demonstrated an interobserver reliability of 0.61. This indicates a substantial agreement among surgeons. The intraobserver reliability for each of the four surgeons in that study was 0.81, 0.78, 0.76, and 0.75, which indicates substantial agreement.

This study aimed to assess whether acetabular bone loss, measured in a simple anteroposterior radiograph of the pelvis, is a predictive factor for failure in the revision technique with impacted bone graft, and whether the measurement of the defect in plain radiographs maintains the same pattern for inter- and intraobserver assessments.

Material and methods

This study was approved by the Research Ethics Committee, under CAE No. 07779812.6.0000.5479. Postoperative pelvic radiographs of 38 patients undergoing revision surgery for total hip arthroplasties were assessed; these patients were operated on by three experienced hip surgeons between 1995 and 2008.

The study included X-rays of patients of both genders who underwent acetabular revision with cemented or uncemented prosthesis, with homologous cancellous impacted graft provided by a bone bank. Hip X-rays in anteroposterior view were selected, with a minimum follow-up of 48 months, all standardized according to previously recommended and

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