



Some solutions for massive loss of acetabular bone in hip reconstruction

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Received: 12 April 2016; Accepted: 24 April 2016; Published: 25 April 2016.

doi: 10.21037/aoj.2016.04.03

View this article at: <http://dx.doi.org/10.21037/aoj.2016.04.03>

Revision total hip arthroplasty (THA) is frequently complicated by loss of acetabular bone. The ideal reconstructive method for the severely deficient acetabulum in revision THA remains unsolved. Paprosky *et al.* (1) created a classification of acetabular bone loss based on the remaining pelvic bony anatomy and its ability to provide support for an acetabular component. Defects are classified by type, indicating whether the remaining acetabular structures are completely supportive (type 1), partially supportive (type 2), or non-supportive (type 3). Type 2A defects are a generalized oval enlargement of the acetabulum. Superior bone lysis is present but the superior rim remains intact. Type 2B defects are similar to type 2A, but the dome is more distorted and the superior rim is absent. Type 2C defects involve more localized destruction of the medial wall. Type 3 acetabular defects demonstrate severe bone loss resulting in major destruction of the acetabular rim and supporting structures. Type 3A bone loss pattern usually extends from the 10 o'clock to the 2 o'clock position around the acetabular rim. In type 3B defects the acetabular rim is absent from the 9 o'clock to the 5 o'clock position. In both type 3A and 3B defects the component usually migrates greater than 2 cm superiorly. Type 3A defects demonstrate moderate, but not complete, destruction of the teardrop (medial wall of the teardrop is still present) and moderate lysis of the ischium. Because the medial wall is present, the component usually migrates superolaterally. Type 3B defects show complete obliteration of the teardrop and severe lysis of the ischium, usually resulting in superomedial component migration.

One potentially simple solution for management of acetabular deficits is the use of a large hemispherical porous-coated cup with multiple screw holes. "Jumbo

cup" has been defined as components larger than 62 mm in women, and larger than 66 mm in men. Cups can also be considered jumbo when they are 10 mm greater than the normal contra-lateral acetabulum. Based on a previous study (2), von Roth *et al.* (3) evaluated the long-term results of acetabular reconstruction using uncemented jumbo cups in revision THA. At 20 years, acetabular component survivorship free from any revision of the metal acetabular component was 83% demonstrated good long-term results with regard to survivorship, radiographic stability, and clinical outcomes for jumbo acetabular revision components.

Jumbo cups have proven to be a safe and durable solution to acetabular defects; however, the extent or geometry of the acetabular bone loss may preclude this option in the presence of more-severe bone defects (4). And when larger deficits are present, flanged cages, custom implants, oblong cups, and other prosthetics have been devised to reconstruct the acetabulum.

A recent article published by Barlow *et al.* (5) assessed radiographic and patient factors predictive of failure in custom triflange acetabular components (CTAC). They retrospectively reviewed 52 patients with preoperative and postoperative radiographs. CTAC failure was defined as revision or removal of the implant. Radiographic failure was defined as >3 mm continuous lucency around the implant or >5 mm displacement on subsequent radiographs. The results were CTAC had an approximately 85% survival rate at a mean follow-up of 4.3 years.

A research performed by Li *et al.* (6) studied 24 hips with a massive acetabular defect with the use of the customized cages. These 24 hips were all performed CT scan and construction of rapid-prototype model to exclude the

possible apply of jumbo cup or a commercially available cage. They designed the cup according to the type of bone defect. They found the mean Harris hip score improved from 36 to 82 after revision in a follow-up period of 24 to 120 months. None of the cups showed radiographic migration except one loose. Authors conclude that individualized custom cages result in stable implant fixation with a close-to-normal hip center and provide a viable solution for acetabular reconstructions with severe bone loss.

In conclusion, there are many solutions for massive loss of acetabular bone, but we still need more high-quality studies analyzing their long-term results.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was a standard submission to the journal. The article did not undergo external peer review.

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/aoj.2016.04.03>). The author has no conflicts of interest to declare.

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/aoj.2016.04.03

Cite this article as: Mao Y. Some solutions for massive loss of acetabular bone in hip reconstruction. *Ann Joint* 2016;1:4.