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Acetabular Cartilage Delamination in Femoroacetabular Impingement: The Underdiagnosis on MRA, Risk Factors and Radiologic Predictors

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Summary:
This study retrospectively analyzes the underdiagnosis of Cartilage Delamination, the risk factors and the Radiological Predictors.

Abstract:
Introduction: Cartilage delamination (CD) is reported to be a very common (31.5%-75%) pathology in patients undergoing surgery for femoroacetabular impingement (FAI). Treatment options vary depending on size and location of the CD and are very limited in patients with advanced CD. Therefore, it is necessary to diagnose CD pre-operatively to plan for surgical treatment. Magnetic resonance arthrography (MRA) is cited in the literature as the standard diagnostic tool of this pathology, but there are discrepancies in the literature as to the effectiveness of this diagnostic tool, with a variety of reported sensitivities and specificities.

Purpose: The objective of this study is to use our own retrospective data in order [1] to assess the frequency, size and location of acetabular CD in our FAI population, [2] to assess the sensitivity, specificity, negative prognostic value (NPV), and positive prognostic value (PPV) of the MRA, and [3] to determine risk factors and radiologic predictors for CD.

Methodology: This study is a single centre, retrospective review of 200 patients, who previously underwent FAI surgery. Two trained assessors reviewed and reported on all surgical videos, clinical notes, x-rays and MRA images and reports. The presence of CD indicated on the MRA report was compared with the presence of CD reported intra-operatively. If CD was found during the operation, the size and location of the CD were measured. Multivariable logistic regression was used to check for correlations between CD and risk factors such as gender, side, age, BMI, length of symptoms before operation, as well as, radiologic factors, over-coverage of the femoral head, hip retroversion, acetabular and impingement cysts, presence and severity of osteoarthritis (OA), alpha angle, anatomy of the labrum and labral tear characteristics.

Results: The patient population studied was 52.5% male and 47.5% female, with an overall mean age of 37.6 years. The average time period between the MRA and the surgical intervention was 0.88 years. 59% of men and 45.3% of women were reported to have CD at the time of surgery, for an overall 47.5% of the patient population. There was no significant difference between the mean age of patients with CD (36.8 years) and that of patients without CD (38.3 years). The mean size of the CD defects were 3.12 cm2 with mean shape, measured from the acetabular rim x sagittal extent, 0.6cm x 4.36cm. Most of the cartilage damage was located in the antero-superior quadrant. The MRA had an extremely low sensitivity of 4.11%, with a high specificity 97.40%. The NPV and PPV were calculated to be 68.18% and 42.86%, respectively. Presence of acetabular cysts, as well as alpha angle correlated with cartilage delamination.

Conclusion: CD in patients with FAI is severely under-diagnosed with MRA. There is need for better standard diagnostic criteria to detect CD on MRA. Reliable prognostic clinical and radiological factors could contribute to the

improved diagnosis and surgical planning, organizing adequately the intraoperative treatment options and informing and consenting properly the patient in order the operation to meet his expectations.