Acetabular dysplasia
MULTIPLE PATHOLOGIES AND MYRIAD SOLUTIONS

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Surgery which is designed to preserve the natural hip joint is currently generating increasing further interest. Our ability to recognise, quantify and address patho-anatomical abnormalities of the hip has moved forward dramatically during the past three decades. This has most recently been enhanced by improved imaging modalities. Dramatic improvements have followed the increased access to, and use of, arthroscopic techniques.

Arthroscopy of the hip is now used for a wide variety of indications. Its role, however, in the management of acetabular dysplasia, remains controversial. There are a number of factors that currently make it difficult to establish the role of arthroscopy in these patients; in particular, how different degrees of dysplasia are defined, the relatively short-term follow-up of arthroscopic studies, and the investigation of how other forms of surgical treatment, such as periacetabular osteotomy (PAO), may compare.

While some authors have suggested that arthroscopic surgery will give significant symptomatic improvement in certain groups of patients, others have reported that patients can be made significantly worse. Few would claim that arthroscopic surgery is appropriate in patients with severe dysplasia, however, there have been reports of arthroscopic intervention for patients with mild or moderate dysplasia.

There remains, however, little agreement as to what constitutes borderline, mild or moderate dysplasia. Most authors use the lateral centre-edge angle (LCEA) as the criterion to differentiate varying severities of dysplasia. Some consider a value of between 20° and 24° to represent mild dysplasia, others consider this range to represent borderline dysplasia. Some consider a LCEA of between 15° and 19° to represent mild dysplasia, whereas others consider this to represent moderate dysplasia.

The LCEA should not be used as the only measure of dysplasia. Pereira et al investigated 150 hips with varying degrees of dysplasia and found that, in those with an LCEA of between 21° and 25°, 72% had an acetabular index (AI) of >10° and 28% had an AI of >15°, indicating a marked variation in the degree of dysplasia within this mild group when taking other measures into account.

A further confounding factor in the assessment of dysplasia is femoral anteversion, which may be significantly increased. This tends to increase the degree of anterior instability of the hip, and may be an important factor in the development of symptoms in a hip with apparently mild dysplasia.

The assessment of acetabular cover following arthroscopic surgery may be incomplete if only one form of measurement is used. It therefore becomes difficult to determine which group of dysplastic hips may be helped by arthroscopic intervention. Part of the process of decision making relates to what is known about the success rates of other forms of treatment. In many patients with minimal degenerative changes and a congruent joint, a rotational acetabular osteotomy, such as a PAO, might be the best way of optimising the cover of the femoral head. There may be dysplastic hips with a low LCEA where other indices of dysplasia are normal, and the morphology of the hip would not lend itself to a PAO.

This difficulty with interpretation of the degree of dysplasia was evident in the paper by Fukui et al, which describes the results of arthroscopic surgery in patients with mild to moderate dysplasia and FAI, with an LCEA of between 15° and 19°. One third of the patients required further surgery although the remaining patients did quite well. Without further information about the dysplastic morphology,
it is difficult to know what it was about the patients that lead them to have a good outcome. If the predominant abnormality was FAI, one might expect satisfactory outcomes. One would imagine that patients with FAI and a horizontal sourcil would have a greater likelihood of success than those with a high AI. In such cases, a rotational acetabular osteotomy would not necessarily be appropriate, as the risk would be to create a negative AI.

The short-term follow-up of arthroscopic studies also makes it difficult to assess whether this form of treatment might be considered definitive. Satisfactory long-term outcomes have been reported after acetabular osteotomies. The goal in young patients is the preservation of the joint as well as symptomatic relief. Arthroscopic studies on articular cartilage lesions in hips with mild to moderate dysplasia (LCEA 16° to 28°) have shown chondral damage in up to 82% of cases, most frequently in the anterior portion of the acetabulum where the joint is overloaded. It is hard to see what arthroscopy alone has to offer in these circumstances. It would seem more logical to offload the area where the articular cartilage injury starts, in order to prevent progression.

The paper from John O’Hara and his colleagues illustrates the benefits achieved by acetabular re-orientation using a variation of the triple osteotomy called the Birmingham Interlocking Pelvic Osteotomy (BIPO). When a pelvic osteotomy is performed in the traditional manner, it is rather unstable. The BIPO, however, has enhanced stability allowing early weight bearing. They report that, in the first 100 cases, there was a 76% survivorship at a mean of 12.5 years. The authors aim to overcorrect the LCEA slightly in order to offload the acetabular rim. The mean post-operative LCEA of 50° in their patients is, therefore, rather high. Other authors have suggested that overcoverage or residual impingement could be a reason for poor outcomes. O’Hara and his colleagues suggest that this is more likely to occur if the overcorrection is in the anterior rather than the lateral plane, and that an impingement-free range of movement must be tested peri-operatively.

The time to recovery is often a consideration when deciding which intervention is suitable for a patient. Arthroscopy is a procedure from which patients recover relatively quickly, although the hip joint itself may take some months to recover. Return to sport after surgery for FAI may take between four and nine months. Although recovery from a procedure such as a PAO is relatively slow in the first few weeks, high level of activities usually return after between six and 12 months post-operatively.

A study by Ross et al looking at patients who had previously undergone arthroscopy of the hip for mild and moderate dysplasia, and subsequently required a PAO, found that these patients usually presented about two years after the arthroscopy with further symptoms. This puts the importance of initial decision making into perspective. It can be frustrating for such patients to find themselves restarting a surgical journey at that stage. Furthermore, PAO surgery is no longer a such a major procedure, and with the advent of minimally invasive approaches the recovery is quicker and the whole process easier for the patient.

There may be a greater role for arthroscopy in the slightly older patient, where a PAO may be a less palatable option, and where there is some evidence that age > 40 years may be associated with worse outcomes. Decisions should be made for each individual patient taking into account the condition of the hip and their expectations. A labral repair may be helpful, and visualising the joint allows an informed discussion with the patient about the prognosis and further treatment options.

The role of arthroscopic intervention in patients with acetabular dysplasia is therefore yet to be clarified. It is clear that these patients may have features which will predispose to a poor outcome. Apart from the inherent instability of the hip, some hypermobility is common and injury to capsular and labral stabilising structures can easily make matters worse. A specific imaging protocol is essential and needs to include more than one radiographic measure of dysplasia. With algorithmic approaches to the analysis of hip pathology both for FAI and dysplasia, currently largely CT based, a standard assessment will be possible. It is important to identify which patients have a predominantly FAI morphology, albeit with a shallow acetabulum.

With improvement in the definition of these groups of patients it should be possible to determine which may be suitable for arthroscopic intervention and which would best be managed with a PAO. Studies on the outcome of PAO in the literature include patients with mild and moderate dysplasia as defined by the LCEA quoted in arthroscopic articles, but the outcomes of these specific subgroups are not separately reported. More specific focus on the outcomes in these patients would provide important comparative information. An important aspect of survivorship of the hip is illustrated in a paper by Hartig-Andreasen et al, where outcomes were poorer if the corrected LCEA was < 30° or > 40°.

An important role for arthroscopic surgery is in the management of intra-articular pathology and to deal with FAI as part of a reconstructive procedure, which may affect the outcome of a PAO. Patients with dysplasia predominantly associated with FAI and an acetabulum that would not be suited to a PAO can be considered as a separate entity. Clearly, there are areas where further research will allow us to better advise and manage these patients.

References
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