



The relationship between Hill-Sachs lesion and recurrent anterior shoulder dislocation

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The relationship between the number of shoulder dislocations and the depth and percent of head involvement of the Hill-Sachs lesions was investigated in this study.

Thirty patients with recurrent anterior dislocation of the shoulder were divided into three groups according to the numbers of dislocations they had presented : Group 1 : 1 to 5 dislocations ; Group 2 : 6 to 20 ; Group 3 : over 20.

The mean percentage of head involvement was 11.9% in the first group, 25.4% in the second group and 26% in the third group of patients with Hill-Sachs lesions. The average depth of the Hill-Sachs lesions was 4.14 mm in the first group, 5.13 mm in the second group and 4.38 mm in the third group.

Based on these findings, it appears that there is a correlation between the number of dislocations and the extent and depth of the Hill-Sachs lesions. Surgical treatment should therefore be performed as early as possible in patients with recurrent anterior dislocation of the shoulder, in order to prevent progression of the Hill-Sachs lesion which can become by itself a cause of instability.

Keywords : Hill-Sachs lesion ; recurrent shoulder dislocation.

humeral head in association with anterior shoulder dislocations (7). Head impression fractures are graded by the percent of head involvement : less than 20% (minor defect) ; between 20% and 45% (moderate defect) ; and greater than 45% (severe defect) (1). Hill Sachs lesions were noted in 31 to 93% of cases of recurrent dislocations in different studies (4, 6, 8, 12, 17, 18, 19, 21, 22). In most of these series, only the incidence of Hill Sachs lesions was studied, and no information was given with respect to the size of the lesion. The Hill-Sachs lesion may render the glenohumeral joint unstable. However, since it is often small or moderate in size, it tends to be neglected. In fact, it has been reported that, as the number of dislocations increases, the size and the incidence of Hill-Sachs lesions also increase (2, 18). If the shoulder keeps on dislocating, the lesion progresses and may become a cause of instability. Therefore, surgical treatment should be considered without delay in patients with more than one episode of dislocation.

INTRODUCTION

The Hill-Sachs lesion is a head impression fracture which occurs after anterior shoulder dislocation. Hill and Sachs reported the presence of a grooved defect in the posterolateral aspect of the

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Fig. 1. — Preoperative double contrast CT arthrography of a 20-year-old patient.

a : Percentage of articular surface involvement ;
d : Depth of the Hill-Sachs lesion ;
s : Size of the Hill-Sachs lesion.

The aim of this study was to assess the possible relationship between the size and depth of Hill-Sachs lesions and the number of shoulder dislocations.

MATERIALS AND METHODS

Thirty patients who underwent open surgery for recurrent anterior shoulder dislocation were included in this study. For preoperative diagnosis, double contrast CT (Computed Tomography) arthrography was used in all patients and open surgery was performed. The Hill Sachs lesions were assessed during the operations and compared with the pre-operative double contrast CT arthrography findings (fig 1).

Minor and moderate Hill Sachs lesions were seen in 25 patients (83.3%). The patients with a Hill Sachs lesion were divided into three groups. The number of previous shoulder dislocations was between 1 and 5 in the first group, between 6 and 20 in the second group and over 20 in the third group. There were 7 patients in the first group, 14 in the second group and 4 in the third group. The average age of the patients was 24 years (range, 19-35).

The relationship between the depth of the Hill-sachs lesions and the percentage of the humeral head affected

by the Hill-Sachs lesion on the one hand and the number of dislocations on the other hand was investigated, as well as the relationship between the age at the first dislocation and the depth and number of Hill Sachs lesions. The SPSS 8.0 software was used for the statistical analysis of the findings.

RESULTS

The average age at the first dislocation was 19.7 years (SD : 1.60) in Group 1, 19.2 years (SD : 3.79) in Group 2 and 15 years (SD : 5.83) in Group 3 of the patients with Hill Sachs lesion. The average percentage of head involvement was 11.9% (SD : 4.91) in the first group, 25.4% (SD : 9.52) in the second group and 26% (Std : 9.52) in the third group of patients with a Hill Sachs lesion. The average depths of the lesions were 4.14 mm (SD : 1.86) in the first group, 5.13 mm (SD : 2.22) in the second group and 4.38 mm (SD : 2.39) in the third group (table I).

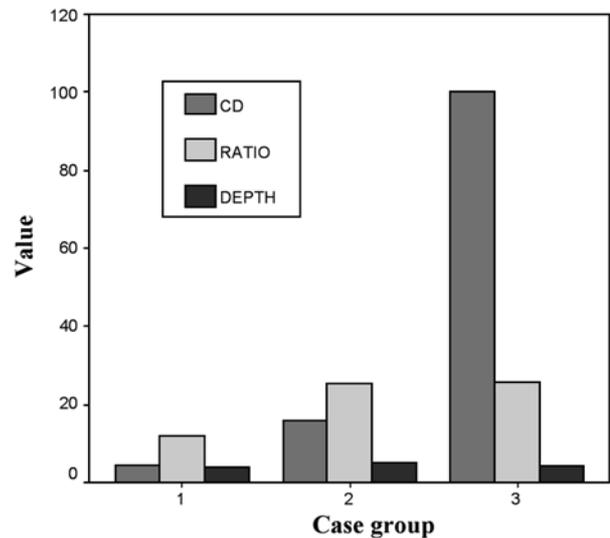


Table I.

CD : Mean number of dislocations

Ratio : Mean percentage of head involvement by the Hill-Sachs lesion.

Depth : Mean depth of the Hill-Sachs lesions.

DISCUSSION

The incidence of Hill-Sachs lesions in patients with recurrent anterior dislocation of the shoulder reportedly ranges between 31% and 93% (4, 6, 8, 12, 17, 18, 19, 21, 22). The reason for this wide range is the development of the diagnosis techniques to date. In fact identification of a Hill-Sachs lesion is very difficult with plain standard radiographs, and requires specific views to demonstrate the lesion (8). With the increasing use of CT and MRI (Magnetic resonance imaging) for the diagnosis of Hill-Sachs lesions, a higher incidence has been reported for this lesion. Wilson *et al* detected Hill-Sachs lesions in 50% of their patients, using plain radiographs, and in 92% using CT arthrography (22). The bone lesions (especially, impacted humeral head fractures, bone islands, sclerosis, bony changes in glenoid cavity and rim) are diagnosed more accurately with CT arthrography than with other diagnosis methods (3, 14, 20). Double contrast CT arthrography has an important role in assessing the localisation and severity of the capsulolabral lesion and in planning the surgical treatment (4, 10, 11, 13, 16). It has been found that the reliability of pre-operative CT arthrography is about 95-100% when compared with the intra-operative findings (5, 13). Although several studies have advocated that there is no relationship between Hill-Sachs lesions and the number of shoulder dislocation, other studies report that the incidence of Hill Sachs lesion increases with the number of shoulder dislocations (1, 2, 9, 18). Spatschil *et al* divided their series into two groups. In the first group, the patients had only one shoulder dislocation and the incidence of Hill-Sachs lesions was 67.2%. In the second group, the patients had more than two shoulder dislocations and the incidence of Hill-Sachs lesion was 83.9%. Besides, they detected that the size of the Hill-Sachs lesion increased with an increasing number of shoulder dislocations (18).

There is only one classification system for Hill Sachs lesions in the literature. Head impression fractures are graded by the percentage of head involvement: less than 20% (mild defect); between 20% and 45% (moderate defect); and greater than 45% (severe defect) (1). According to

this classification system, it is considered that the lesion proceeds only through one dimension of the affected articular surface and the size of the lesion is assessed in one single dimension. The main pit-fall of this classification system is that it evaluates a three-dimensional Hill-Sachs lesion using a one-dimensional CT or MRI view, based on which the surgeon evaluates whether the lesion causes instability of the shoulder joint or not and also whether an additional surgical action would be necessary or not. With the improvement of the diagnosis methods which make it possible to evaluate the three dimensional geometry of the lesions, more reliable classification systems will hopefully be developed in the future.

Mild defects are commonly seen in cases with anterior shoulder instability; they do not require additional specific surgical treatment and they do not contribute to shoulder instability. Moderate defects are rare in recurrent instability. If the lesion involves more than 30% of the humeral head, an additional surgical action such as bone graft and tendon transfers may be required on moderate size defects (1). Severe defects are very rare in anterior shoulder instability; they are seen in cases with neglected and locked shoulder dislocations. Reconstruction surgery limiting external rotation is advisable in cases with large lesions. However, if the lesion affects more than 50% of the humeral head, arthroplasty may have to be considered (15).

In our series, the incidence of Hill-Sachs lesion was 83.3%. It appeared that the extent of the lesion on the surface of the humeral head increased with the number of shoulder dislocations. In the second group (patients with 6 to 20 dislocation episodes), the lesion affected 25.4% of the articular surface, more than twice more than in the first group (patients with 1 to 5 dislocation episodes), where it affected 11.9% of the articular surface. Besides, the depth of the lesion was increased from 4.14 mm to 5.13 mm. Most authors consider that surgical treatment of a classic recurrent shoulder dislocation is only indicated if there have been more than five shoulder dislocations. According to our findings in group 1 and 2, if a patient has presented more than five dislocations, the size of the lesion increases and it becomes exceedingly large. We therefore

suggest that surgery should be considered as soon as possible for recurrent shoulder dislocations. Otherwise, Hill-Sachs lesions may progress and become by themselves a cause of instability, while compromising the results of common anatomic repair methods for anterior shoulder dislocation and requiring additional specific action to correct the bone defect. Once again, according to the results of our series, the average age at first dislocation in the first and second group was fairly similar, whereas in the third group, in which the average number of dislocations was well about 20, the average age at first shoulder dislocation was 15 years and this is a very important point. Thus, the risk of having more than 20 episodes of shoulder dislocation is increased in patients who had their first episode of dislocation at a younger age.

CONCLUSION

These findings show a correlation between the number of dislocation episodes in patients with recurrent anterior dislocation of the shoulder and the extent and depth of an existing Hill-Sachs lesion. Therefore, in order to prevent progression of the Hill-Sachs lesion, which may result in increasing shoulder instability, surgical treatment should be considered without delay in patients with recurrent anterior dislocation of the shoulder.

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