CORRELATION BETWEEN BANKART AND HILL-SACHS LESIONS IN ANTERIOR SHOULDER DISLOCATION

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Background: Bankart lesions and Hill-Sachs lesions are commonly associated with anterior shoulder dislocations. The presence of Bankart lesion indicates the need for surgical repair. Magnetic resonance imaging (MRI) has been shown to be sensitive in detecting these two lesions. The aim of this study is to investigate the correlation between Bankart lesions and Hill-Sachs lesions on MRI for patients with traumatic anterior shoulder dislocations.

Methods: Between 2003 and 2005, 61 patients from Alfred and Sandringham Hospitals had an MRI as part of the investigation for traumatic anterior shoulder dislocations. The MRI scans were reviewed and subsequently confirmed by a radiologist to show the presence or absence of Bankart and Hill-Sachs lesions. The data were then analysed by a statistician.

Results: Although patients with one of these lesions were more than two-and-a-half times as likely to have the other, small study numbers precluded this result from achieving statistical significance. (odds ratio, 2.67 (0.83–8.61), P = 0.10). Younger age was a strong predictor of a recurrence of shoulder dislocation (odds ratio, 0.93 (0.89–0.98), P = 0.005). The presence of Bankart or Hill-Sachs lesions on MRI for the primary shoulder dislocation group was similar to the recurrent group (73% vs. 72% for Bankart lesion and 67% vs. 70% for Hill-Sachs lesion).

Conclusion: There is a strong correlation between both lesions. This apparent trend can be useful in predicting the presence of a Bankart lesion when a Hill-Sachs lesion is identified on a plain radiograph. This study suggests the consideration of surgical repair after identification of a Hill-Sachs lesion on plain radiographs, especially for younger patients where the rate of re-dislocation is high.

Key words: Bankart, correlation, Hill-Sachs, magnetic resonance imaging, shoulder dislocation.

INTRODUCTION

The shoulder is the most commonly dislocated large joint. Its dislocation occurs in 1–2% of the population.1 Anterior shoulder dislocation counts for 90–95% of all shoulder dislocations.2,3

Bankart lesion is an avulsion of the joint capsule and labrum from the anterior glenoid rim with or without a bone fragment. This lesion was first described by Bankart.4 Hill-Sachs lesion is a chondral or osteochondral compression injury in the posterolateral aspect of the humeral head against the bony glenoid rim. This lesion occurs as the soft base of the humeral head impacts against the relatively hard anterior glenoid. Both lesions consist of osseous and non-osseous part as shown in Figures 1 and 2. Plain radiographs in special views may only show the osseous part of both lesions. Magnetic resonance imaging (MRI) has been shown to be more sensitive in detecting these lesions as it also shows the non-osseous part of the lesion.1

Bankart and Hill-Sachs lesions are commonly associated with anterior shoulder dislocations. A Bankart lesion can be identified in as many as 85% of dislocations and a Hill-Sachs lesion can be identified in 30–40% of anterior dislocations and up to 80% of recurrent dislocations.5,6

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To our knowledge, no paper has documented the correlation between Bankart and Hill-Sachs lesions. The aim of this study is to investigate the correlation between Bankart and Hill-Sachs lesions on MRI for patients with traumatic anterior shoulder dislocations.

METHODS AND PATIENTS

Three hundred and twelve patients from Alfred and Sandringham hospitals’ clinical coding database were identified to have traumatic anterior shoulder dislocations from Jan 2003 to June 2005 (30 months). A total of 61 patients had an MRI as part of their investigation and were included in the study. Their medical records were reviewed to see whether the dislocation was a primary or recurrent event.

The MRI scans were reviewed and subsequently confirmed by a radiologist to show the presence or absence of Bankart and Hill-Sachs lesions.

Statistical analysis

Data were analysed by a statistician using SAS (SAS Institute, Cary, NC, USA). Univariate analysis was carried out using Student’s t-tests and χ² tests for equal proportion and validated using logistic regression. Results are reported as means (range) or odds ratios (OR, 95% confidence interval). A two-sided P-value of 0.05 was considered to be statistically significant.

RESULTS

Sixty-one patients were identified to have an MRI as part of their investigation of shoulder dislocation. Two-thirds of these patients
were men and half of these patients had shoulder dislocation on the right side.

Although the average age of the 61 patients was 34.1 years old, patients with a recurrent shoulder dislocation were found to be significantly younger than those with primary shoulder dislocation, 30.8 (range, 17–59) vs. 44.1 (range, 17–79), \( P = 0.005 \). Younger age was a strong predictor of a recurrence of shoulder dislocation (OR = 0.93 (0.89–0.98), \( P = 0.005 \)).

Fifteen patients (25%) were identified to have a primary shoulder dislocation. Eleven of these patients (73%) had a Bankart lesion and 10 (67%) had a Hill-Sachs lesion on MRI. Sixty-four per cent of those with a Bankart lesion had Hill-Sachs lesions. Seventy per cent of those with Hill-Sachs lesions had a Bankart lesion.

Forty-six patients (75%) patients were identified to have recurrent shoulder dislocations. Thirty-three of these patients (75%) had a Bankart lesion and 32 (70%) had Hill-Sachs lesions on MRI. Seventy-nine per cent of those with a Bankart lesion had Hill-Sachs lesions. Seventy per cent of those with Hill-Sachs lesions had Bankart lesions.

The presence of Bankart or Hill-Sachs lesions on MRI for the first-time dislocator was similar to the recurrent group (73% vs. 72% for Bankart lesion and 67% vs. 70% for Hill-Sachs lesion).

The correlation between the Bankart lesion and the Hill-Sachs lesion are summarized in the Table 1.

The correlation between Bankart lesion and Hill-Sachs lesion showed that if one of the lesions was identified, the chance of the other being present was more than two-and-a-half times as likely (OR = 2.67 (0.83–8.61), \( P = 0.10 \)).

The surgical repair for shoulder dislocations can be carried out arthroscopically or as an open reconstruction. Open reconstruction is a versatile procedure capable of addressing detachment lesions and capsular pathology when necessary. The arthroscopic technique has advantages of better cosmetic result, better overall range of motion and function (no loss of external rotation), ability to deal with other pathology and lower cost. The disadvantages of arthroscopic procedures are primarily a suggested higher recurrent rate of instability.

There are some suggestions that the best candidate for an arthroscopic repair is one with instability because of a discrete Bankart lesion without any capsular laxity or injury, whereas the best candidate for an open repair is, in cases of traumatic instability with capsular laxity, either in combination with a Bankart lesion or as an isolated finding.

Table 1. Correlation between Bankart and Hill-Sachs lesions

<table>
<thead>
<tr>
<th></th>
<th>No Hill-Sachs lesion</th>
<th>Hill-Sachs lesion</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Bankart lesion</td>
<td>8</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Bankart lesion</td>
<td>11</td>
<td>33</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>42</td>
<td>61</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Recurrence of shoulder dislocation is significantly influenced by the patients’ age when the first dislocation occurs. Approximately 70% of patients younger than 30 years suffered from recurrent dislocations. In this study, the average for the primary shoulder dislocation was more than 13 years older than the recurrent group, and equates to a reduction in risk of approximately 7% for every additional year. This may further be investigated how much of the lifestyle issues such as sport activities account for this reduction in the risk of a further shoulder dislocation.

Options of shoulder dislocation treatment involve non-surgical rehabilitation and surgical repair. The initial conservative (non-surgical) treatment usually involves a period of immobilization in a broad arm sling for 3–6 weeks, although there is still some disagreement regarding the necessary length of immobilization. This is followed by a period of rehabilitation, gradually returning to normal daily activities, including sports. This conservative treatment option has been shown to have a failure rate (a further shoulder dislocation) between 45% and 94%. However, conservative treatment should first be attempted if a Bankart lesion is not detected. It is important therefore to detect this lesion as its presence suggests the need for surgical repair.

The surgical repair for shoulder dislocations can be carried out arthroscopically or as an open reconstruction. Open reconstruction is a versatile procedure capable of addressing detachment lesions and capsular pathology when necessary. The arthroscopic technique has advantages of better cosmetic result, better overall range of motion and function (no loss of external rotation), ability to deal with other pathology and lower cost. The disadvantages of arthroscopic procedures are primarily a suggested higher recurrent rate of instability.

Many studies have compared arthroscopic and open repair. There are some suggestions that the best candidate for an arthroscopic repair is one with instability because of a discrete Bankart lesion without any capsular laxity or injury, whereas the best candidate for an open repair is, in cases of traumatic instability with capsular laxity, either in combination with a Bankart lesion or as an isolated finding.

Bankart lesions may be identified with the special view radiograph called West Point Axillary View. Hill-Sachs lesions may be identified with anterior posterior (AP) X-ray with the arm in internal rotation or Stryker Notch view. However, these special views can only detect the osseous part of the lesions and further MRI investigation is necessary to detect the non-osseous part, such as the avulsion of joint capsule and labrum part of Bankart lesion and the chondral compression injury of Hill-Sachs lesion.

Magnetic resonance imaging is an excellent non-invasive tool used in the diagnosis of shoulder pathology which, in contrast to computed tomography and bone scan, does not use ionizing radiation. One study showed perfect agreement between MRI and arthroscopy in assessing the presence or absence of a Hill-Sachs lesion or a Bankart lesion. MRI is sensitive in diagnosing Hill-Sachs lesions, rotator cuff tears and capsular and glenoid...
labral tears, all of which may play roles in further shoulder dislocations. The presence of Hill-Sachs lesion may correlate with further shoulder dislocations depending on the size of the lesion.

From the data that we have in this study, the presence of Bankart lesion or Hill-Sachs lesion on MRI for those with the primary shoulder dislocation is almost similar to the one for the recurrent group (73% vs. 72% for Bankart lesion and 67% vs. 70% for Hill-Sachs lesion). These results may indicate the severe nature of the injury in the primary shoulder dislocation group, which justified the use of MRI. Being a retrospective study, it is difficult for us to ascertain the initial mechanism of injury and its severity as well as the reason for organizing the MRI.

The similarity of finding the two lesions between the primary shoulder dislocation and the recurrent group may also indicate that if either of Bankart or Hill-Sachs lesions are to occur, they are more likely to occur with the primary traumatic dislocation. Longer follow up of the primary shoulder dislocation group may be necessary to see whether further dislocations occur. A study showed that in young patients who had sustained a single anterior shoulder dislocation, there was no further shoulder joint pathology on MRI at follow up of 5 years or more. MRI after the first traumatic shoulder dislocation may be necessary to help with surgical planning, but further investigations are required from an economic cost perspective.

In conclusion, the strong correlation between Bankart lesion and Hill-Sachs lesion in this study showed that if one of the lesions was identified, the other was 2.67 times as likely to be present. Although this correlation was not statistically significant because of small study numbers, this apparent trend can be useful in predicting the presence of a Bankart lesion when a Hill-Sachs lesion is identified on plain radiograph. This study suggests the consideration of surgical repair after identification of a Hill-Sachs lesion on plain radiographs, especially for younger patients where the rate of re-dislocation is high. MRI may be organized as part of the surgical planning.

REFERENCES

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