INTRODUCTION

Bony defects of the glenoid and humeral head are common injuries associated with anterior glenohumeral instability. A large Hill-Sachs lesion has been considered as a risk factor of the postoperative recurrence. To evaluate the risk of a large Hill-Sachs lesion, a new concept, the ‘glenoid track’ was proposed by Yamamoto et al. [1]. The glenoid track is a contact zone of the glenoid on the humeral head with the arm in maximum external rotation, horizontal extension and abduction. If the Hill-Sachs lesion extends more medially over the medial margin of the glenoid track, then there is a risk of engagement and dislocation at this point where the Hill-Sachs lesion crosses over the medial margin of the glenoid track. Recently, Omori et al. [2] confirmed the existence of the ‘glenoid track’ in vivo using MRI images.

The incidence of ‘engaging Hill-Sachs lesion’ was reported to be 1.5% by Burkhart et al. [3]. However, no studies which demonstrate the incidence of a large Hill-Sachs lesion which needs to be treated with use of the glenoid track concept have been reported. The purpose of this study was to clarify the incidence of the ‘engaging’ Hill-Sachs lesion with use of the glenoid track and to investigate the location of the Hill-Sachs lesion in the glenoid track when it was located inside the glenoid track.

METHODS

The DICOM data of CT images were retrospectively reviewed of 134 shoulders of 67 patients with unilateral anterior instability. The bilateral affected cases and the shoulders which were previously operated were excluded. There were 48 males and 17 females with an average age of 28 years (range, 15-75 years). CT images were obtained by a CT scanner (SOMATOM Definition Siemens AG, Munich, Germany) with a patient supine in the center of the gantry table with the arm at the side of the trunk. CT images were obtained with a contiguous axial 1-mm slice thickness, pitch of 1. The DICOM data of the CT images were scanned into the personal computer. Using the DICOM analyzing software, ‘zioterm2009’, which allows us to make multi-planar reconstruction, the data were reconstructed to oblique sagittal images en face to the glenoid fossa at first. On Surface-shaded three-dimensional view of the glenoid, the width of the glenoid in bilateral side was measured and the difference between the affected and unaffected side was calculated as the width of the glenoid bone defect. Next, the DICOM data were reconstructed to 1-mm-thick slices in the oblique-coronal plane perpendicular to the line connecting the medial margin of the cuff attachment site. In these slices, the maximum distance along the humeral head surface from the medial margin of the Hill-Sachs lesion to the medial margin of the footprint of the rotator cuff was measured (Fig.1). The width of the glenoid track was defined as the length obtained by subtracting the glenoid bony defect from 85% of the unaffected glenoid width. When the Hill-Sachs lesion was located inside the glenoid track, the location of the Hill-Sachs lesion in the glenoid track was assessed.

RESULTS

A Hill-Sachs lesion was observed in 65 cases (97%). The glenoid bone defect was observed in 51 cases (76%) of shoulders and its average width of the glenoid bone defect was 2.3 ± 1.7 mm (0.1 to 7.0 mm). The most medial margin of the Hill-Sachs lesion was located 15.0 ± 3.9 mm (5.7 to 24.0 mm) medial from the footprint, which was equivalent to 72% ± 20% (31% to 128%) of the glenoid track width (Fig.2A). In 4 cases (6%), the most medial margin of the Hill-Sachs lesion extended medially over the glenoid track. They all had a large Hill-Sachs lesion together with a large glenoid defect except one case, which had a narrow (9.5 mm wide) but medially located Hill-Sachs lesion (Fig.2B, 2C).

DISCUSSION

In our series of 67 cases, the incidence of Hill-Sachs lesion which extended medially over the glenoid track was 6% (4 cases). Burkhart et al. analyzed the results of 194 arthroscopic Bankart repairs and reported that the incidence of ‘engaging Hill-Sachs lesion’ was 1.5% [3] and Pagnani et al. reported that it was 27% [4]. Our data are comparable to the Burkhart's results. In most cases of recurrent anterior instability of the shoulder, we do not need to worry about the risk of the engagement.

In the present study, there were two cases whose Hill-Sachs lesion was located inside the glenoid track of unaffected glenoid width, but had a risk of the engagement because of the large glenoid defect. It is important to realize that the risk of Hill-Sachs lesion as a cause of dislocation depends on the relative size of the lesion to the glenoid. The glenoid track enables us to take the glenoid and humeral defects into consideration at the same time.

The present study had several limitations. First, the sample size was small. The data of bilateral shoulders with unilateral instability were used because of the measurement of the glenoid defect. Second, 85% of the glenoid width was used as the width of the glenoid track in the present study. However, the magnitude of the width of the glenoid track may vary according to the cases because it is affected by the range of motion of the shoulder.

In conclusion, the Hill-Sachs lesion that needs to be treated surgically was observed in 4 out of 67 shoulders with anterior instability (6%). The medial margin of the Hill-Sachs lesion was located at an average 15.0 mm medial from the footprint (70% of the glenoid track width).

SIGNIFICANCE

With use of the glenoid track concept, the incidence of a large Hill-Sachs lesion which needs surgical treatment was 6%.

REFERENCE