Original Article

Assessment of variation of scapula- A Morphological study

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Abstract

Background: The scapula is a flat triangular bone situated posteriorly overlying the second to seventh ribs on both the side. The present study was conducted to determine the morphological type of scapulae. **Materials & Methods:** The present study was conducted on 68 scapula bones of either side. The shape of the glenoid fossa was considered as pear-shaped or inverted comma shape in presence of a glenoid notch & oval in absence of notch. Anterior-posterior glenoid diameter-1 (AP-1), Anterior-Posterior Glenoid Diameter-2 (AP-2), Length, Breadth and Glenoid cavity index (GCI) was assessed. **Results:** Shapes of glenoid cavity was pear (34), comma (24) and inverted shape (10). The difference was significant (P- 0.01). The mean length of the scapula was 138.4 mm, breadth was 98.12 mm, SI glenoid diameter was 36.4 mm, AP glenoid diameter 1 was 25.36 mm, AP glenoid diameter 2 was 16.22 mm and glenoid cavity index was 68.2%. **Conclusion:** Scapula is a bone of shoulder girdle which communicates with humerous and clavicle. The most common type of shape of glenoid fossa was pear followed by comma and inverted.
Key words: Bone, Glenoid cavity, Scapula

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INTRODUCTION

Scapula a bone of shoulder girdle is among the interesting bones of our body because of variations present in it. Its lateral angle becomes truncated and broadened that bears the glenoid cavity which articulates with the head of the humerus in the shoulder joint. The acromion projects forwards almost at right angle, from the lateral end of the spine of scapula. The lower border of the crest of the spine becomes continuous with the lateral border of the acromion at the acromial angle which forms a subcutaneous bony landmark. The scapula is a flat triangular bone situated posteriorly overlying the second to seventh ribs on both the side. Morphologically acromion process of scapula is classified by many researchers into three types; type –I (flat), type-II (curved), type-III (hooked).[1] Variations of acromion may be associated with pathogenesis like subacromial impingement syndrome and rotator cuff tear. Anatomically the glenoid cavity is considered to be a head of scapula. Various shapes of glenoid cavity is described earlier as; pear, round and oval or inverted comma. Anatomical basis and variations in shape of glenoid is fundamentally important in clinical practice.[2] The shoulder joint is the most frequently dislocated joint in the body. Dynamic factors of the rotator cuff muscles and the static factors of the glenohumeral ligaments, the labrum and the joint capsule play a role in gleno-humeral joint stability. The knowledge of the normal anatomical features and variations in shape and size of the glenoid fossa are required for better understanding of shoulder joint arthroplasty

are prerequisites for complete understanding of the mechanics of shoulder joint.[3] The present study was conducted to determine the morphological types of scapulae.

MATERIALS & METHODS

The present study was conducted in the department of Anatomy. It consisted of 68 scapula bones of either side. The study was approved by institutional ethical committee.
The border of the fossa was the slightly raised rim of the glenoid fossa. The shape of the glenoid fossa was considered as pear-shaped or inverted comma shape in presence of a glenoid notch & oval in absence of notch.
Maximum distance from inferior point on the glenoid margin to the most prominent point of supraglenoid tubercle was superior-inferior glenoid diameter (SI) which was also the maximum height of glenoid cavity.
The maximum breadth of articular margin of the glenoid cavity perpendicular to glenoid cavity height was anterior-posterior glenoid diameter-1 (AP-1). Anterior-Posterior Glenoid Diameter-2 (AP-2) was the anterior-posterior diameter (breadth) of the top half of the glenoid cavity at the mid-point between the superior rim and the mid equator. Glenoid cavity index (GCI) was calculated as GCI= AP 1/SI X 100. All measurements were taken to the nearest millimeter using the Vernier sliding caliper which is accurate to 0.1 millimeter. Results thus obtained were subjected to analysis. P value less than 0.05 was considered significant.

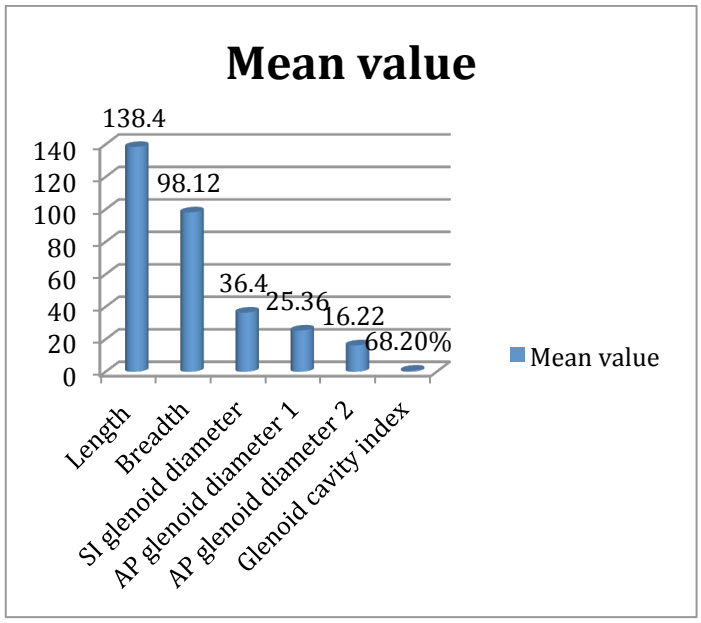
RESULTS

Table I Shapes of glenoid cavity

Shapes	Number	P value
Pear	34	0.01
Comma	24	
Inverted	10	

Table I shows that shapes of glenoid cavity was pear (34), comma (24) and inverted shape (10). The difference was significant (P- 0.01).

Graph I Graph I Dimensions of glenoid cavity



Graph I shows that mean length of the scapula was 138.4 mm, breadth was 98.12 mm, SI glenoid diameter was 36.4 mm, AP glenoid diameter 1 was 25.36 mm, AP glenoid diameter 2 was 16.22 mm and glenoid cavity index was 68.2%.

DISCUSSION

The scapulae are a pair of triangular, large, flat bones that are situated dorsally in the ribcage in relation with the second to seventh ribs. The scapula has three borders, three processes, and three angles. The Glenoid (Gk. Gléne "socket") fossa is oriented at the lateral angle of the bone. The glenoid cavity which is also known as the head of the scapula is connected with the head of the humerus to form shoulder joint.[4] When the arm is swing by the side of the body, the glenoid cavity is directed slightly upwards, forwards and laterally and when the arm is raised above the head level it is directed almost straight upwards. The glenoid cavity shows variable morphology. There is a notch present on its antero-superior part i.e. on the anterior glenoid rim which gives its different shape. When this glenoid notch is indistinct its shape is like pear, when it is distinct it looks like inverted comma shape and when it is absent its oval shape.[5] The present study was conducted to determine the morphological

type of scapulae. In present study, we found that shape of glenoid cavity was pear (34), comma (24) and inverted shape (10). We observed that mean length of the scapula was 138.4 mm, breadth was 98.12 mm, SI glenoid diameter was 36.4 mm, AP glenoid diameter 1 was 25.36 mm, AP glenoid diameter 2 was 16.22 mm and glenoid cavity index was 68.2%. Kamal et al[6] studied the scapular length in Gujarati population of India where they found a mean length of 136.03±11.49mm in male scapulae and 119.63±8.81mm in female scapulae. Dhindsa et al[7] in a morphological study the pear shaped glenoid cavity was most common type followed by inverted comma shaped and the oval glenoid cavity was least common type. Mean length and breadth of scapula was 136.07±14.1mm & 97.13 ± 10.63mm respectively. Mean SI diameter was 36.71±4.14 mm, mean diameter AP-1 was 24.85±3.50 mm, mean diameter AP-2 was 16.27±3.24 mm and GCI was 65.40±8.14%. Karelse et al[8] conducted a study on 105 scapulae. Various morphological types of acromion process, different shapes of glenoid cavity, suprascapular notch were observed and studied. Morphological types of acromion process found to be; type I (flat)- 43 (40.95 %), type II (curved)- 51 (48.57%), type III (hooked)- 11 (10.47 %). Various shapes of glenoid cavity determined as; pear, oval and inverted comma. Five different types of suprascapular notch were noted, commonest being Type III- 47 (44.76%). According to study of Akhtar et al[9] on 90 scapulae, in 72% of the specimens, the glenoid notches of the scapulae were absent or oval shaped, whereas in 28% the notch was well expressed and the glenoid cavity was pear shaped. Morphological study of Polguj et al[10] on glenoid cavity has detected 85% ovoid glenoids and 15% inverted comma shaped glenoids in eighty shoulders, which is closely matching with the frequencies of inverted comma shape of South Indian scapulae.

CONCLUSION

Scapula is a bone of shoulder girdle which communicates with humerous and clavicle. The most common type of shape of glenoid fossa was pear followed by comma and inverted.

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