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Development of the olecranon bursa

An anatomic cadaver study

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Anatomic dissection of the elbows of 63 cadavers selected at random were performed in an attempt to find out whether the incidental disparity of olecranon bursitis between children and adults might be explained by anatomic differences. The volume of the bursae was determined by syringes used for methylene blue injections.

There were no olecranon bursae in children under the age of 7 years; the volume of the bursae increased with age; and the bursa was usually larger on the right, i.e., the common dominant side. The formation of the bursae in late childhood can explain the low incidence of olecranon bursitis in children.

Introduction

Septic, as well as nonseptic, bursitis in adults is often associated with occupational or sports trauma (Canoso & Scheckman 1979, Ho et al. 1978, Thompson et al. 1978) or systemic conditions, such as gout, tuberculosis, or rheumatic disease (Mannik 1983). Septic bursitis in childhood has been described as occurring predominantly in superficial bursae, like the prepatellar and olecranon bursae (Tachdjian 1972). However, only 1 case of septic olecranon bursitis in a child has been reported in the literature (Paisley 1982). In our department, we have not recorded a single case of septic or nonseptic olecranon bursitis in children over the last 25 years.

Our anatomic study was performed to find out whether the incidental disparity of bursitis between children and adults might be explained by anatomic differences.

Materials and methods

Both elbows were dissected in 63 cadavers shortly after death. The cadavers were selected at random. They were either stillbirths or traffic victims without signs of trauma to the elbows.

A longitudinal incision centered over the tip of the olecranon was performed and the region of the bursa exposed and injected with methylene blue. The volume was measured three times using Hamilton Microliter (Hamilton Co., Reno, Nevada, U.S.A.) syringes. The mean value was calculated. For the age-group up to 10 years, a 5 μl syringe was used; for the 10 to 15 years' group, a 10 μl, and for the older 2 groups, a 250 μl syringe. The methodological error using Hamilton syringes for volume measurement is $\pm$ 1 per cent.

Results

No bursa was found in those under 7 years of age. In the 7–10-year-old age-group, a minute, unilateral bursa was found in 4 out of six cases – the largest being about 3 μl (Table 1). From the age of 10 years upwards, a bursa was present in all the

Table 1. Volume of the olecranon bursae in various age groups

Age group (years)	No. of cases	Mean volume (μl)	
		Right	Left
<1	30	None	None
1– 7	17	None	None
7–10	6	0.5	0.1
10–15	5	9.8	1.0
15–20	5	99.7	82.0
50–80	24	3.540	2.920

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elbows. Volume was found to increase with age, ranging from 3 to 580 μl in the 10–15-year-old age-group, and from 3 to 450 μl in the 15–20-year-old age-group. In the 50–80-year-old age-group, the minimum volume was 663 μl and the maximum volume 9,500 μl.

In all the age-groups, the bursa was larger on one side and the difference increased with age. The bursa in right elbow was larger in all the age-groups except in the 7–10-year-old age-group, in which the volumes measured were very small and within the range of the methodological error, i.e., ± 1 per cent.

Discussion

Bursitis, septic and nonseptic, is usually named in the literature after a supposedly predisposing occupation – housemaid's knee, student's elbows, miner's elbow, or weaver's bottom. Infected bursae are usually superficially located, such as the prepatellar and olecranon bursae, and therefore probably more often subjected to trauma.

In early childhood the elbow is rarely exposed to traumatic factors predisposing to bursitis. Above this age, school children write or draw in a sitting position, with flexed elbows resting on the table. Repeated pressure and friction in the area of the olecranon may induce the formation of a small bursa, which increases in size with age and recurrent trauma. Hence, an increased probability of bursitis might ensue.

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