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PSEUDARTHROSIS OF THE SURGICAL NECK OF THE HUMERUS

Two Cases, One Bilateral.

By

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Fracture of the upper end of the humerus is common in the elderly, and usually unites after a few days' immobilization followed by active exercises. A few fractures through the surgical neck are unstable, with poor or no contact between the fractured ends. This type of fracture occurs in 4-14 per cent (*Wentworth* 1940: 6 of 155, *Einarsson* 1958: 12 of 136, *Drapanas et al.* 1960: 14 of 100). However, union is nearly always obtained merely by reduction, in some cases open. However, some surgeons, especially in France, perform osteosynthesis as a routine procedure, either with a Küntscher type of nail or by a special nail somewhat like the Smith Petersen nail for the femoral neck (*Witte* 1948, *Voss & Hartmann* 1953, *Gandin & Delagrangé* 1960). A few have resected the head of the humerus (*Bandmann* 1951) or carried out alloplasty (*Poilleux & Courtois-Suffit* 1954), but both methods have given poor results.

Pseudarthrosis of the surgical neck is extremely rare, so rare that it is not even mentioned in a number of the major recent series (*Wentworth* 1940: 155 cases, *Madsen* 1949: 117 cases *Kothe* 1953: 136 cases, *Voss & Hartmann* 1953: 104 operated cases, *Poilleux & Courtois-Suffit* 1954: 50 cases), or in monographs on pseudarthroses of the long bones (*Verbeek & Dubbelman* 1961). Only in the rare cases with simultaneous total or partial dislocation of the humeral head there might be non-union (*Bandmann*).

From the literature I have been able to collect 7 cases of pseudarthrosis of the surgical neck of the humerus.

Murphy (1914) described a case in which union was not obtained

despite bone grafting, but nailing was needed. *Mauclaire* (1920) obtained union in a case of pseudarthrosis by implantation of the shaft into the head of the humerus.

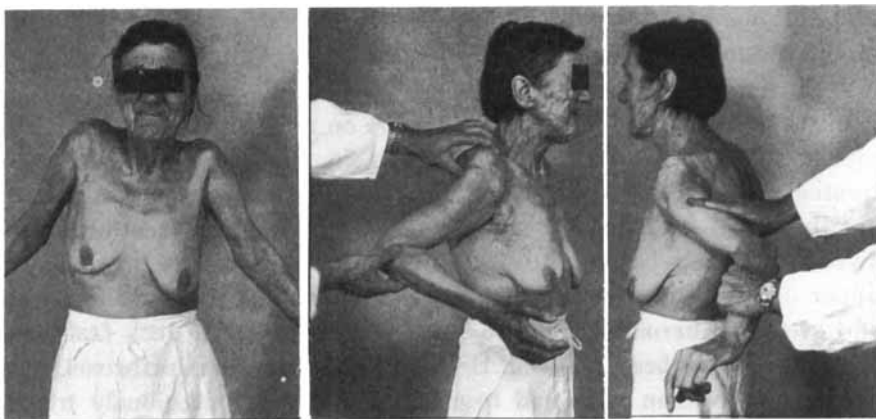
In the more recent literature 5 cases are on record: *Nissen-Lie* (1952) reported 2 cases in women aged 70 and 76, both of whom had been treated primarily by sling. One year later pseudarthrosis was found, but there was no pain and fairly good function, so no treatment was given. *Einarsson* (1958) after-examined 481 cases of fractures of the upper end of the humerus, including 99 involving the surgical neck and greater tuberosity, and 136 cases of pure surgical neck fractures 11 of which had been reduced. He found only one pseudarthrosis, in a 78-year-old woman who had been treated 4 years previously by an axillary pad and sling for 6 weeks despite poor contact at the site of the fracture. At follow-up the patient suffered pain day and night and was unable to dress or undress. The shoulder was tender and swollen. There was severe wasting, and mobility was considerably restricted, there being a maximum range of movement of 50°. Moreover, there was 6 cm. shortening. *Drapanas et al.* (1960) described among 100 patients, 14 with lacking contact at the site of the fracture. Four were treated by closed and 6 by open reduction. All united. Four did not have reduction and 2 developed pseudarthrosis. Four years later one of these patients had good mobility, no pain, and was satisfied with the result. The other one had not had reduction because of delirium tremens. As good mobility resulted and as the patient had no pain, no treatment was instituted. One year later there were no complaints, but pseudarthrosis.

PRESENT CASES

As bilateral pseudarthrosis of the surgical neck has never been published previously, the following case history will be reported:

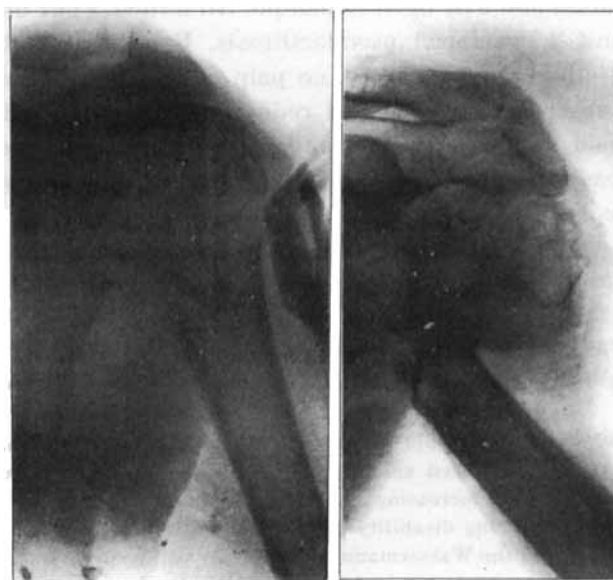
Case rec. 3763/59. A 64-year-old widow. After a severe attack of influenza at the age of 26 the patient had been aphonic and asthmatic, having bronchitis, several attacks of pneumonia, and increasing exertional dyspnoea. Since the age of 44, therefore, she had been receiving disability pension. Syphilis had been demonstrated at the age of 27 years, and the Wassermann reaction was still positive in the serum, but had never been positive in the spinal fluid, and neither now nor previously had there been any clinical signs of neurosyphilis. From her youth the patient had been suffering from epilepsy with grand mal seizures, but had not been investigated or treated for this condition.

At the age of 62 the patient fell off a chair in an epileptic fit and sustained frac-

*Fig. 1.*

Case 1: From the left:

- (1) Maximum range of active movement in the right and left shoulder joint 4 and 24 months respectively after the fractures were sustained. On the left the fragment of the shaft may be seen as a prominence beneath the skin anteriorly.
- (2) and (3) show the looseness of the pseudarthroses on the right and left. Note the severe wasting of the shoulder muscles.

*Fig. 2.*

X-rays of the left shoulder of Case 1, showing from the left:

- (1) The fracture immediately after the accident.
- (2) A loose pseudarthrosis 4½ years later.

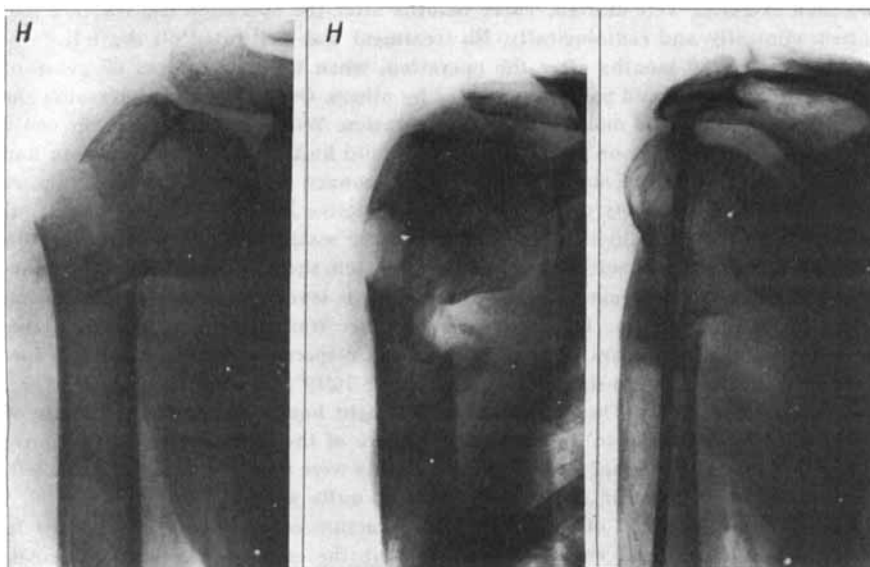


Fig. 3.

X-rays of the right shoulder of Case 1, showing from the left:

- (1) The fracture immediately after the accident.
- (2) The pseudarthrosis 4 months later, and
- (3) firm union 30 months after the operation (the screw has been removed, but there is still a Rush pin through the fracture).

ture of the surgical neck and a Colles fracture on the left. After reduction and immobilization in a plaster cast from the knuckles to the shoulder for 7 weeks the wrist fracture had united, while the humeral fracture was still loose. The patient failed to appear for further treatment.

After falling on the stairs at the age of 64, in another epileptic fit, the patient sustained a fracture of the right surgical neck and was treated with a sling and axillary pad for 4 weeks followed by active exercises for 4 weeks, after which she failed to attend.

Four months after the latter fracture the patient was admitted to a medical department, totally helpless and in a thoroughly miserable condition. I was called and found wobbly pseudarthrosis in the 4-month-old right-sided as well as in the 24-month-old left-sided humeral fracture. With difficulty the patient could feed herself with the left hand, but was unable to do anything else. She was emaciated and anaemic and dyspnoeic upon minor exertion. She was fairly demented. There was severe generalized muscular wasting, most marked in the muscles of the shoulders and upper arms. Active movements of the shoulders were exclusively in the pseudarthroses (Fig. 1). The general condition did not permit major surgical procedures. At operation we found on the right a typical pseudarthrosis with a smooth-walled joint cavity filled with synovia and surrounded by a fibrous capsule. The fragments were fixed with a Rush pin and a screw. The arm was carried in a sling for 4 weeks

and then exercises were started. Three months after the operation the fracture had united, clinically and radiologically. No treatment was instituted on the left.

At follow-up, 30 months after the operation, when the patient was 67 years of age, she was helpless and had to be minded by others. Owing to her helplessness she had attempted suicide 6 months after the operation. With her right hand she could feed herself and manage on the lavatory. She could knit. Her general condition had further deteriorated, and she had frequent pulmonary episodes with fever. Severe dyspnoea developed merely upon examination of active joint mobility. She had constant pain in both shoulders, monstrous muscular wasting, severe grating in both shoulder joints which were also tender. On the left there was still loose pseudarthrosis, and the lower fragment could be displaced several centimetres in relation to the upper one (Fig. 2). The right-sided fracture was still firm (Fig. 3). Active movements in the shoulders on the right and left respectively were as follows: forward-up: $75/20^\circ$, outward-up: $30/15^\circ$, backward: $70/40^\circ$, external rotation: $50/15^\circ$, internal rotation $80/80^\circ$. The finger tips of the right hand reached to the middle of the nape of the neck and to the sacral bone, those of the left hand to 10 cm. above the ear and to the infranatal sulcus. All movements were painful, more so on the left. The function distal to the shoulder joints was quite good.

Since adequate fixation of the 4-month-old fracture on the right had resulted in healing, the poor general condition could not be the cause of the pseudarthrosis. Although there was some slight improvement in function, the result was nevertheless poor, due also to the patient's other diseases.



Fig. 4.

Case 2: X-ray film 3 years after the accident showing pseudarthrosis of the surgical neck of the humerus.

Through the Directorate of Accident Insurance I found another patient with pseudarthrosis of the surgical neck of the humerus:

Directorate of Accid. Insur. No. N 10277/58: A 58-year-old private nurse fell, while working in a bathroom, and sustained a left-sided fracture of the surgical neck with poor contact between the fragments, also after reduction. After immobilization in a sling for 10 days, active exercises were started. Six weeks after the accident, union was found to be deficient, and operation was contemplated but given up because of rheumatoid arthritis, which did not involve the shoulder, but the wrist and finger joints as well as the left knee. It was fairly mild and had been stationary for several years and non-disabling. Operation was considered several times, but when it was offered to the patient 10 months after the accident she declined. During the subsequent 2½ years the patient could not work for more than a maximum of 3 days a week. At follow-up 3 years after the accident she reported that she had been obliged to give up her light nursing work 3 months ago because of the sequelae of the fracture. She had pain in the shoulder and arm and reduced strength. Active movements took place in the loose pseudarthrosis with severe grating and amounted to: forward-up and outward-up: 80°, backward: 45°, internal and external rotation: 80/70°. With difficulty, she could carry her hand to the nape of her neck and to the small of the back. There was severe wasting of the shoulder muscles. X-rays revealed a wide pseudarthrosis with sclerosis of the bone ends (Fig. 4). The disability was fixed at 60 per cent.

CONCLUSION

Unstable fractures through the surgical neck of the humerus need more attention than other fractures affecting the upper end of the humerus. A good contact and effective fixation at the site of the fracture should be established as quickly as possible, and union must be confirmed radiologically before the patient is lost sight of. If these principles are observed, pseudarthrosis seldom develops, but if it does it may lead to severe disability.

SUMMARY

Pseudarthrosis of the neck of the humerus is extremely rare. Only 7 cases seem to be on record. Two cases are reported, one with bilateral pseudarthrosis resulting from fractures sustained at an interval of 20 months. Both patients were severely disabled.

RESUME

La pseudarthrose du col huméral est extrêmement rare. 7 cas seulement ont pu être recueillis dans la littérature. Il est rapporté deux cas de cette maladie, l'un souffrant de pseudarthrose bilatérale après des

fractures survenues à 20 mois d'intervalle. Les deux malades étaient fortement invalidés.

ZUSAMMENFASSUNG

Pseudarthrosis colli humeri kommt sehr selten vor. Man konnte nur 7 Fälle aus der Literatur sammeln. 2 Patienten werden besprochen, von denen der eine ein doppelseitige pseudarthrose nach Brüchen hatte, die mit einem Zwischenraum von 20 Monaten entstanden waren. Beide Patienten waren schwer invalidisiert.

For the permission to publish Case 2 my thanks are due to G. Hagen, head of the Directorate of Accident Insurance.

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