CALCINOSIS*

A. R. HAMILTON, SYDNEY, AUSTRALIA

According to the American Illustrated Medical Dictionary (Dorland 1944), calcinosis is "a condition marked by the deposition of calcium salts in nodules under the skin, in muscles, tendons and nerves," whereas calcification is defined as "the process by which organic tissue becomes hardened by a deposit of calcium salts within its substance." Brooks (1934) and Atkinson and Parkes Weber (1938) have described the history of the condition and co-ordinated the clinical and biochemical investigations of many cases. Calcinosis is usually described as of two types, calcinosis universalis and calcinosis circumscripta.

Calcinosis universalis more frequently affects children, the youngest reported being five weeks old. It is widespread throughout the body, is often associated with scleroderma and sclerodactylia, and may be fatal. The flexor aspects of the limbs are more prone to be affected and the fingers usually escape. *Calcinosis circumscripta*, on the other hand, usually affects older persons and is more often confined to the terminal phalanges of the fingers and extensor aspect of the elbows and knees, where great fluctuant masses may be present. In both types the deposits are multiple and often symmetrical. Females are more frequently affected than males, especially in calcinosis circumscripta. Some writers believe that degenerative changes occur in fibrous and fatty tissue before calcium is deposited. Peripheral vasomotor disorder and Raynaud's disease are commonly associated with calcinosis, and it is reported that syphilis and malaria have been precursors of some cases. Sometimes the skin over the calcium nodules ulcerates and a cheesy purulent material exudes, and, in severe cases, the whole or most of the skin may be affected and extensive ulceration occurs. In calcinosis universalis the joints of all limbs may swell and stiffen. Many theories as to the etiology of the disorder have been enunciated but none has yet been proven. The deposits consist mainly of calcium phosphate and calcium carbonate and they are often associated with giant-cell formation and inflammatory reaction. Other chemical substances are sometimes present in small quantities. The blood chemistry has been examined exhaustively in many cases and, although the calcium content of the blood may be high in a large number of cases and has sometimes been depressed, it is usually normal. Phosphates in the blood stream are sometimes increased. The general consensus is that calcium metabolism is not disordered.

Many treatments have been tried, mostly without benefit. Spontaneous recovery has been reported, and cure or improvement has been ascribed to many remedies, including a ketogenic diet, Bier's hyperaemia, ammonium chloride, low calcium diet, extract of anterior pituitary gland and thyroid, radiotherapy, sodium citrate, disodium phosphate, and partial thyroidectomy. Recent cases have been reported by Norman (1947), Woolf (1947) and McLean and Lebo (1948). The last was in a man, aged fifty-six years, who had been taking 18,000 international units of vitamin A and 150,000 units of vitamin D daily for two and a half years. Fourteen months after the vitamin therapy had been stopped, all symptoms disappeared and the calcium deposits had vanished. In this case the serum calcium and phosphorus were normal whereas the acid phosphatase was raised. Aviators with traumatic and similar calcifications were subject, at high altitudes, to attacks of pain ("bends") ascribed to deprivation of blood supply for various reasons including gas bubbles and arterial spasm (Allan 1945). Burnett *et al.* (1949) described five cases of fairly widespread calcinosis, with hypercalcaemia and renal insufficiency, ascribed to excessive ingestion of milk and alkalis over a prolonged period for peptic ulcer.

* Paper read at the Annual Meeting of the Australian Orthopaedic Association in Adelaide, May 1950.

The foregoing remarks relate to the fairly generalised type of calcinosis, and very scant reference is made in the literature to the type of calcinosis which stimulated the writing of this paper—namely calcinosis localised to one deposit of calcium, or at most two symmetrically placed deposits. Elmslie in 1932 described his findings at operation in eight cases of supraspinatus calcinosis. In some cases the deposit communicated with a small cavity in the greater tuberosity and most of his cases were cured by operation and physical therapy. In order to separate this type from the others one might designate it “calcinosis localisata.”

CALCINOSIS LOCALISATA

We are all familiar with supraspinatus calcinosis and the calcium deposit in the subacromial bursa; the former is probably the more common, and in my experience is more frequent in the upper and middle classes of society than in the labouring class. The condition can be either insidious or acute in onset, and those with a long history of ache in the shoulder, and pain on movement, sometimes suddenly develop acute pain, extreme tenderness and a moderate degree of swelling in the region of the greater tuberosity with marked muscle spasm; in some cases the shoulder has increased local temperature and the patient may have a fairly high temperature—in one case 101·8 degrees Fahrenheit—and increased pulse rate. Radiographs show a deposit of calcium which most likely preceded, by some weeks at least, the acute culmination which brings the patient to treatment. In some cases it may be difficult to state whether the calcium deposit is in the supraspinatus tendon or in the bursa, whereas in other cases there is no doubt that it is in the bursa. On one occasion the supraspinatus region was explored for the deposit and the tendon of that muscle was found to be extensively impregnated with calcium granules—the patient took many months to recover, and this delay might be attributed to the surgical intervention.

The calcium deposit disappears completely in almost every case provided the joint is rested uninterruptedly and completely for at least six weeks. An abduction splint is best, because sometimes a considerable degree of periarticular fibrosis is left after the calcium disappears and the restoration of movement, which may be very slow, is more readily accomplished from the abducted position. If one can be certain that the deposit is in the bursa, aspiration and irrigation through two large-bore needles, or incision and evacuation of the calcium, may hasten relief. Radiotherapists contend that radiotherapy brings improvement and even cure. Not infrequently supraspinatus calcinosis is bilateral, although only one shoulder may be painful.

CASE REPORTS

Cases 1 and 2. Calcinosis in the supraspinatus tendon—Intense pain with local swelling and heat, and marked muscle spasm. In each case radiographs showed a well defined opaque deposit above the greater tuberosity (Figs. 1 and 2). Local anaesthetic injected without marked benefit. In one, the history of a painful stiff shoulder preceded the final acute stage by two years. Both patients had a raised temperature and pulse for some days, and in one of them there was a neutrophil leucocytosis and an increased blood sedimentation rate; in this case pain was referred to the neck, and down the arm to the whole of the hand. An abduction splint was worn for many weeks and almost full shoulder movement has been restored; although complete absorption of the calcium has taken place, slight pain is felt at the extreme of certain movements.

Case 3. Calcinosis probably in a bursa—Woman aged forty-seven years. Pain in shoulder for three weeks. Acute onset during night. Swollen for two weeks. All movements of shoulder limited. Radiographs showed deposit (Fig. 3). Blood sedimentation rate normal. Abduction splint applied. Seven weeks later calcium almost gone. Wore splint for three months. Some adhesion formed in spite of constant physiotherapy. Shoulder manipulated, with restoration of full movement. Recent examination revealed a full range of movement; some periarticular fibrosis causing a “noisy” joint; slight pain during occupations requiring an abducted arm; and a small flake-like deposit of calcium distal to the greater tuberosity and far removed from the original deposit.

Case 4. Calcinosis in subacromial bursa—Woman aged thirty-five years, complained of pain in the left shoulder for about ten weeks. The pain began while playing golf, and gradually increased and finally limited the movements of the shoulder. Examination revealed an acutely tender swelling about three-quarters of an inch in diameter situated over the lateral aspect of the greater

FIG. 1

Case 1—Calcinosis in supraspinatus tendon.

FIG. 2

Case 2—Calcinosis in supraspinatus tendon.

FIG. 3

Case 3—Calcinosis above the greater tuberosity
—probably in a bursa.

FIG. 4

Case 4—Calcinosis in subacromial bursa.

tuberosity of the humerus. Movements of the shoulder were full and accompanied by phasic pain during abduction and rotation and also by a sharp click. No pyrexia. Radiographs showed a large deposit in the subacromial bursa (Fig. 4). An abduction splint was applied; calcium absorbed completely in five weeks and full function was regained nine weeks after application of splint.

Case 5. Supraspinatus calcinosis with acute symptoms—Male aged forty-two years. Three days previously dumped on to right shoulder when surfing. No discomfort until same evening when shoulder and upper arm became painful and pain increased. On examination, shoulder swollen and acutely tender over lesser tuberosity and tip of coracoid. All movements of shoulder were very restricted. Shoulder warm. Radiographs showed small area of supraspinatus calcinosis. Pyrexia 103 degrees Fahrenheit. Treated by rest. In two weeks complete recovery took place. Subsequent examination revealed full range of movement and no tenderness: further radiographs were not taken.

Case 6. Calcinosis of the ankle region—On one occasion, a small quantity of material like that found in calcinosis was evacuated through an incision into the subcutaneous tissue on the antero-lateral aspect of the ankle region for a painful swelling in a middle-aged man, with complete relief of symptoms.

Case 7. Calcinosis of a thumb—Acute onset of pain and swelling of thumb. The thumb was hot and the condition simulated a deep infection. Radiographs showed an opaque deposit in front of the interphalangeal joint (Fig. 5). Incision and evacuation of the calcium resulted in a complete relief of symptoms. The patient was a dentist, and repeated pressure of the thumb on the local anaesthetic syringe might have been a causative factor.

FIG. 5

Case 7—Calcinosis of a thumb.

FIG. 6

Case 8—Calcinosis of a finger.

Case 8. Calcinosis of a finger—Female aged thirty-four years. This patient, a medical practitioner, gave a history of vague pain in the right middle finger; about six weeks after the onset of pain she received a very firm handshake, and three hours later the finger was very tender and swollen. The temperature was raised to 99 degrees Fahrenheit. Radiographs showed a deposit of calcium (Fig. 6). The swelling and pain increased and became unbearable; a splint was therefore applied. The dorsum of the hand swelled and the finger became rigid. A week later, symptoms began to improve and a few days later still she was able to use the hand (ironing) and recovery took place in three or four weeks. A radiograph taken three months later showed slight deposit of calcium still present. On examination five months after the acute onset there was some tenderness on firm pressure and slight thickening over the joint antero-laterally; movements were full. Three months later there was no pain, tenderness, swelling or limitation of movement, and a radiograph showed complete disappearance of the calcium.

Case 9. Calcinosis in the region of the lateral epicondyle of the humerus (Fig. 7)—This case was reported in the *British Journal of Surgery* (Hamilton 1938).

Case 10. Calcinosis at the back of the wrist—A ganglion had been present in the wrist for two years. Sudden severe pain with increased swelling, and raised local temperature. Radiograph showed calcified deposit (Fig. 8). The wrist was splinted, penicillin and sulphonamides, and infra-red ray were administered. At the end of six weeks a radiograph showed complete absorption of the calcium. (Dr F. C. Yarad's case).

Case 11. Calcinosis in the region of the subscapularis bursa—A man aged forty-seven years complained of pain in the region of the left shoulder. Six weeks previously he had fallen on to his left elbow; three weeks later he could not lie on the left shoulder which made a "crunching

FIG. 7

Case 9—Calcinosis near lateral epicondyle of humerus.

FIG. 8

Case 10—Calcinosis at dorsum of the wrist.

FIG. 9

Case 11—Calcinosis in the region of the subscapularis bursa.

FIG. 10

Case 12—Calcinosis in the region of the greater trochanter.

noise"; one week later he suffered "pins and needles" in the left upper arm, followed by pain in the shoulder. Radiography showed calcium deposit in the axillary aspect of the shoulder (Fig. 9). The lateral view indicated this to be placed anteriorly. An abduction splint was applied for about eight weeks. A radiograph subsequently showed complete absorption of the calcium, and he resumed work soon afterwards.

Case 12. Calcinosis in the region of the greater trochanter—Local pain and tenderness over greater trochanter for three weeks (Fig. 10).

Case 13. Calcinosis in the region of the flexor carpi ulnaris tendon—History of local pain; subsequent progress unknown. (Mr D. J. Glissan's case.)

DISCUSSION

Since patients suffering from this localised type of calcinosis respond so readily to rest, and since extensive investigation of the calcium-phosphorus metabolism in cases of the more generalised type has proved negative, the patients recorded in this paper were not submitted to biochemical investigations.

No information is available as to the treatment or the end-results in the cases of calcinosis about the greater trochanter and in the region of the flexor carpi ulnaris tendon, and they will therefore be omitted from this discussion. The remaining cases were all characterised by: 1) intense pain and tenderness at the site of the lesion; 2) absence of any other clinically obvious area of calcinosis; and 3) the complete absorption of the calcium after rest in some cases and incision in others; no doubt those treated by incision would have responded to rest equally well, although not so rapidly.

It appears that two factors at least must be considered in the etiology of this condition: first, impairment of tissue vitality by some injury or pre-existing pathological condition; and second, infection by some haematogenous organism or toxin. The administration of antibiotics should be given a fair trial in those fulminating cases with pyrexia and abnormal blood sedimentation rate.

Although splinting is effective, operative treatment in selected cases offers a more rapid cure; nevertheless, most patients prefer to undergo conservative treatment. In view of the occasional unfortunate and frequent unpleasant effects of radiation, one is loathe to recommend this form of treatment when rest alone will bring about improvement.

SUMMARY

1. The salient features of calcinosis universalis and calcinosis circumscripta are described.
2. The term "calcinosis localisata" is suggested to distinguish the localised type of calcinosis from the more widespread calcinosis.
3. Thirteen cases of calcinosis localisata are described: in five the lesion was situated about the greater tuberosity of the humerus; one was in the axillary aspect of the shoulder; one on the dorsum of the foot; two in the digits of the hand; one on the dorsum of the wrist; one in the region of the flexor carpi ulnaris tendon; one on the lateral aspect of the elbow; and one at the tip of the greater trochanter.
4. The value of rest is emphasised; in some cases chemotherapy appeared to be indicated.

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