CALCIFICATION OF INTERVERTEBRAL DISCS IN CHILDREN

C. S. Walker, Stoke-on-Trent, England

From the Stafford General Infirmary

Calcification of intervertebral discs was first described by Calvé and Galland (1922). Since then many other cases have been recorded, the calcification usually occurring in the nucleus pulposus but occasionally in the peripheral part of the intervertebral disc. The condition may cause vague symptoms, but in most cases it is an accidental finding on radiographic examination, apparently causing no symptoms at all. Usually the calcification is seen in the thoracic or thoraco-lumbar region.

Most cases have occurred in adults and calcification in intervertebral discs of children has seldom been found; only seven cases have been fully recorded in the literature. Unlike calcification in adults, the condition can be accompanied by quite marked signs and symptoms, and it is therefore of more clinical significance.

Báron (1924) described the case of a boy aged twelve who complained at first of influenzal symptoms, backache and a temperature of 101·3 degrees Fahrenheit. By the tenth day the pain was more severe and he had some kyphosis. He had an erythrocyte sedimentation rate of 32 millimetres in the first hour and a leucocytosis of 12,000 cells per cubic millimetre. Radiographs showed a large calcified area in the disc between T.12 and L.1 with a smaller area between L.1 and L.2. The pain and temperature subsided in a few days and recovery was complete in four weeks. Subsequent radiographs showed the calcified areas slightly larger four months later, but after one year they had disappeared.

Kohlmann (1931) described a twelve-year-old boy who complained of sudden backache with slight tenderness in the upper thoracic region. Radiographic examination showed a dense calcified area in the disc between T.4 and T.5. The symptoms persisted for a few weeks only and after two months the calcified zone was very much smaller.

Lyon (1932) gave a description of a boy aged eight who had sudden pain and stiffness of the neck. He had a high fever for two days, but recovery was complete after twelve days. Dense calcification between T.6 and T.7 was seen on radiographic examination. This was much less five months later and had disappeared in eight months.

Von Held (1934) gave an account of a ten-year-old boy who had pain in the head, neck and left shoulder. He had stiffness of the neck with some hyperextension. Radiographs showed dense calcification in three discs, between C.2 and C.3, C.3 and C.4, and C.5 and C.6. The pain had cleared up at the end of two months and the calcification had disappeared after two and a half months.

Keyzer (1939) published the case of a boy of two and a half who had sudden severe pain in the neck accompanied by a raised temperature and marked stiffness. The child had a leucocytosis with a white cell count of 14,000 cells per cubic millimetre. Radiographs showed calcification in the anterior halves of the discs between C.2 and C.3, C.3 and C.4, and C.4 and C.5. The symptoms slowly subsided over the course of several weeks, but no change was seen on radiographic examination several months later.

Weens (1945) was the first to publish a case in a female child. A five-year-old girl had marked pains in the back of the head and neck for five days and a temperature of 100 degrees Fahrenheit. She had had some aching for two months before this. She had hyperextension of the neck with very limited flexion and marked thoracic kyphosis. Radiographs showed dense calcification between C.6 and C.7. The white cell count was only 8,200 per cubic
millimetre, but after eight days it had risen to 11,400. The temperature returned to normal after two days and the pain had gone in four days. A radiograph twelve days afterwards showed the calcified area smaller, and it had disappeared in four months.

Cohen, Burnip and Wagner (1949) gave an account of a girl aged six who had complained of recurrent abdominal pain for three years. There were no abnormal physical signs but a radiograph showed calcification in the disc between T.12 and L.1. It was thought that the pain could not be attributed to the calcified disc.

CASE REPORT

In June 1944 a girl aged ten was referred to the Stafford General Infirmary on account of pain behind the left hip for ten weeks. Her mother stated that the child had never held herself well and that she had complained of occasional pain when her back was jarred.

There was no abnormality to be found in the left hip, but the child had marked lumbar lordosis and some thoracic kyphosis. She had some limitation of movement of the upper lumbar spine with tenderness to the left of the upper lumbar region. The blood count was normal.

Radiographs showed dense areas of calcification in three discs, the lowest thoracic and the upper two lumbar (Fig. 1). The uppermost mass corresponded fairly accurately with the position of a normal nucleus pulposus but with slight bulging into the body on either side. The lowest calcified area was larger and was not only bulging into the posterior thirds of both adjacent bodies but was also projecting backwards into the intervertebral canal. The middle calcified mass appeared to be disintegrating, and a large part of it had escaped laterally to the left side of the disc. The other lumbar discs showed slight bulging of the nucleus pulposus into the bodies, but no calcification.

The patient was advised to rest in bed at home, but a radiograph two weeks later showed the lowest disc to be projecting further into the canal, and more of the central calcified mass had "oozed" out laterally (Fig. 2). It was therefore decided to immobilise the spine, and the child was supported on a straight frame. After three or four months, the calcification between T.12 and L.1 had almost disappeared, but there was no obvious change in the other two discs (Fig. 3).

The patient had no further symptoms, but the lowest calcified disc still appeared to be projecting into the canal, and frame fixation was continued for six months. She was then allowed up with a back support and periodic check radiographs were taken. There was no change until the end of 1946—two and a half years after the onset—when the upper calcified mass slowly absorbed but did not completely disappear (Fig. 4).

The patient remained symptom-free until August 1947, when she had some pain in the right loin for a few days. A radiograph then showed the lowest calcified mass becoming fragmented (Fig. 5), and four months later it had almost disappeared (Fig. 6). Three years later, in 1950, the only calcification persisting was a slight amount in the disc between T.11 and T.12; this had completely disappeared by 1952.

The patient has had no further symptoms, and clinically, apart from moderate lumbar lordosis, she appears to have a normal spine. A recent radiograph (Fig. 7) shows very slight narrowing of the three affected discs. Apart from slight persistence of the bulging into the posterior thirds of the bodies adjacent to the affected discs, the vertebrae are of normal contour.

DISCUSSION

This case did not present the marked clinical symptoms of some of those previously recorded, but a serious complication might have arisen if the calcified nucleus pulposus had prolapsed farther backwards into the canal. This threat was averted by prolonged immobilisation in recumbency followed by the wearing of a posterior spinal support.
Dense areas of calcification in intervertebral discs between T11–T12, T12–L1 and L1–L2.
The calcified mass between T12 and L1 disintegrating and escaping laterally; that between L1 and L2 projecting backwards in the canal.

Two weeks later. More of the calcified mass has oozed out laterally and the lowest disc has protruded slightly further backwards.
Figure 3—After four months, the calcification between T.12 and L.1 has disappeared.
Figure 4—Two years later. The T.11-T.12 disc is almost clear of calcification.

Figure 5—Three years after onset. Pain in left loin for a few days. Remaining calcified mass disintegrating.
Figure 6—Four months later. Calcification almost disappeared. Figure 7—June 1954; ten years after onset. No calcification but slight narrowing of the three affected discs. Bodies of normal contour except that the discs still bulge into their posterior thirds.
It is notable that, in the author's case at least, the calcified masses caused no symptoms while they were lying dormant. The only two occasions on which the patient complained of pain corresponded with the disintegration of the calcified zone before its absorption. The cause of calcification in intervertebral discs in childhood is uncertain. In adults, the calcification is probably part of the process of degeneration occurring in discs and, as such, is probably irreversible. In children, the etiology must be different. It may be a metabolic disturbance, but, if so, it is difficult to explain why one, two, or at the most three, discs only are affected.

Because three of the patients had pyrexia, leucocytosis and a raised erythrocyte sedimentation rate, it has been suggested that the condition might be a metastatic infective process. The normal adult disc is avascular and cannot be primarily affected in haematogenous infections. But in childhood the intervertebral disc is supplied by a number of blood vessels which penetrate the cartilage plate; these undergo slow degeneration early in life, the process being complete by the age of twenty or thirty. Thus the discs in children are connected with the general circulation and a blood infection is possible. The fact that in most of the cases the calcification disappeared quite rapidly certainly indicates an ample blood supply, but it does not confirm the infective theory. In the author's case and in four of the other seven, there was nothing to suggest any infection.

SUMMARY

1. A case of calcification in the intervertebral discs of a child is described.
2. The difference in the condition as it affects children and adults is discussed.
3. The etiology is considered but no definite conclusion is suggested.

REFERENCES