

Postoperative intervertebral discitis

Discitis is a rare complication of disc operation. During a 10-year-period 1 100 patients were operated for lumbar disc herniation and only eight patients developed postoperative discitis. The symptoms began 3 weeks after the operation and the most prominent clinical feature was back pain with muscle spasm. The sedimentation rate was highly elevated but the body temperature was slightly elevated for only a few days. Typical radiographic findings were narrowing of the affected disc space and end-plate resorption 3-4 weeks after the initial symptoms. In the early phase, CT showed hypodense disc material in the affected disc space, which may be the first radiological sign of discitis.

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Inflammation of the disc space is a rare complication of disc operation (Ford & Key 1955). The incidence rate has been estimated to be below 1 per cent. El-Gindi et al. (1976) found an incidence of 0.8 per cent in a series of 650 operations. Because the complication is rare, the diagnosis may be delayed for several days to weeks. The symptoms may be regarded as a consequence of unsatisfactory operation or recurring disc herniation.

During the last 2 years, we have had six cases of postoperative discitis, which led us to check the hospital records of patients operated for herniated disc in order to analyze the patients treated for recognized symptoms of this disease.

Patients

The material consisted of 1 100 consecutive patients, who underwent surgery for lumbar disc herniation at Oulu University Central Hospital from January 1973 to December 1983. Eight patients (one female and seven males) developed postoperative discitis (0.73 per cent). The age range was 31-46 (mean 33) years. The mean age of all the patients operated for disc herniation was 38 years.

The affected and operated disc spaces are presented in Table 1. In all but two cases, disc herniation was found during the primary operation and the symptoms were initially relieved. In Cases 3 and 4 an adjacent interspace had been mistakenly explored. The symptoms of disc herniation were not relieved but were accompanied by new symptoms compatible with discitis. In Case 3, a second operation was performed in the correct interspace, which also developed discitis.

Report of Case 3

A 31-year-old man was referred to the hospital because of severe right sciatica lasting over a month. The myelogram and computerized tomography (CT) showed a right-sided herniated disc in the fourth lumbar interspace. At operation the third lumbar interspace was opened by mistake. A central protrusion found at this interspace was removed. The pain was not relieved, and 3 days after operation severe back pains with muscle cramps appeared in the lumbar region. The erythrocyte sedimentation rate (ESR) rose to 139 mm/h and the white cell count to 14 300. The operation wound healed well and the patient was afebrile. Blood cultures were negative. Three weeks of cloxacillin treatment was started a week after operation, but had no effect on the symptoms.

Three weeks postoperatively the plain lumbar film showed normal lumbar interspaces (Figure 1A). In CT the third lumbar disc contour was normal, but its

Table 1. Eight cases of postoperative discitis

Case	Sex	Age	Interval between operation and symptoms (days)	Disc space	
				Herniated	Discitis
1	F	41	21	L5-S1	L5-S1
2	M	21	21	L2-L3	L2-L3
3	M	31	3	L4-L5	L3-L4 and L4-L5*
4	M	38	21	L4-L5	L3-L4*
5	M	28	15	L4-L5	L4-L5
6	M	42	10	L5-S1	L5-S1
7	M	30	14	L5-S1	L5-S1
8	F	42	12	L5-S1	L5-S1

* The wrong interspace was operated; the prolapse was later evacuated.

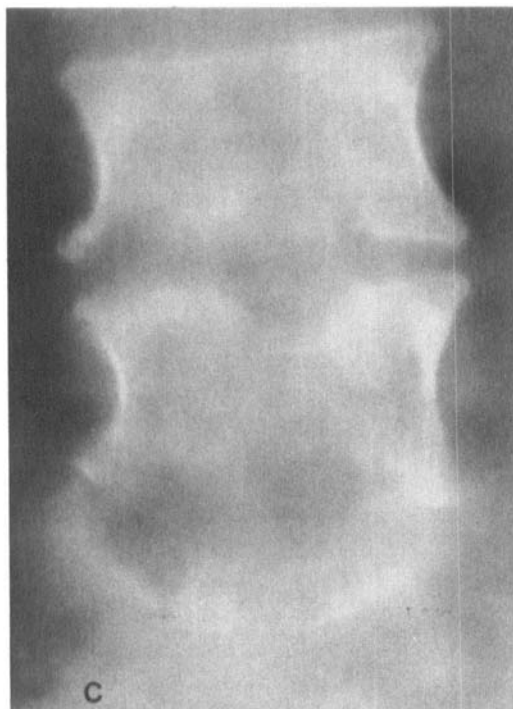


Figure 1. Plain radiography and multidirectional (spiral) tomogram of the lumbar spine of Case 3.

- A: Lateral view 3 weeks after operation.
 B: Corresponding view 2 months after operation of the third interspace (superior arrow) and 1 month after operation of the fourth interspace (inferior arrow). The interspaces are narrow.
 C: Simultaneous frontal tomogram illustrating co-existing end-plate resorption.

from the fourth interspace and the third interspace was explored. The latter was clean and the bacteriological culture was negative. Cloxacillin was discontinued, although the erythrocyte sedimentation rate remained very high (94 mm/h). The patient was somewhat febrile postoperatively. Two months after operation of the third interspace and a month after operation of the fourth interspace, the plain X-ray films showed narrowing of both interspaces (Figure 1B). Multidirectional tomography also disclosed end-plate resorption (Figure 1C). The symptoms were relieved and the patient was discharged with crutches.

However, back pains and muscle cramps recurred and the patient was readmitted 3 weeks later. The pain now radiated from the low back to both hips. The back was scoliotic and spastic. No new findings appeared in the neurologic examination. The patient was afebrile and the erythrocyte sedimentation rate had risen to 103 mm/h.

density was low (Figure 2). Because of persisting symptoms, the patient was reoperated a month after the onset of discitis. The herniated disc was removed

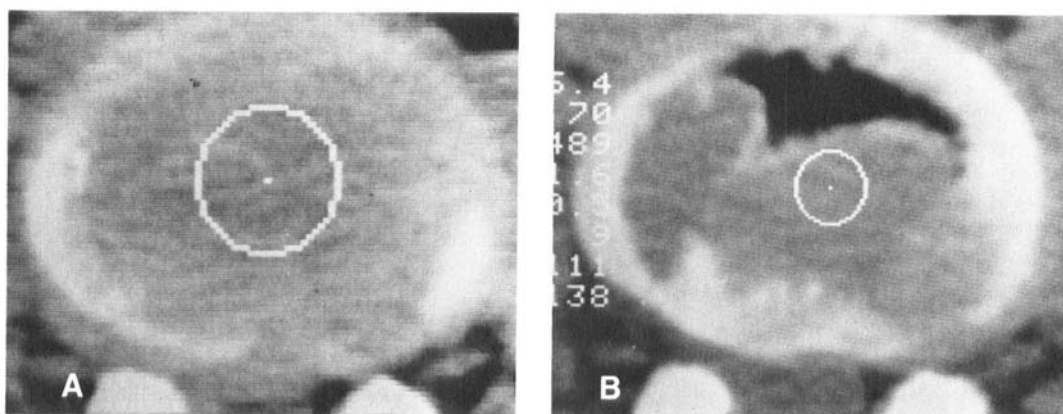


Figure 2. CT of the third lumbar disc in Case 3, 3 weeks (A) and 6 months (B) after the onset of postoperative discitis. In the early CT the disc material had the low density of 36.4 Hounsfield Units (HU). In the late CT islets of bone indicate uneven end plates, the black area vacuolization of the disc, and the density of the disc material itself was 76.4 HU, i.e. in the normal range.

Cloxacillin therapy was resumed and the erythrocyte sedimentation rate dropped to 73 mm/h within a week. After a week of treatment, the pain and spasm decreased and the patient was discharged again.

Symptoms of discitis slowly disappeared. The patient was able to move without crutches 2 months after the second operation. The antibiotic was discontinued after 6 weeks of treatment. The erythrocyte sedimentation rate was normal in 4 months. Six months after the onset of symptoms degenerative changes were seen in CT. The patient returned to his work a month later.

Results

Clinical findings

The postoperative symptoms appeared within days or weeks after operation (Table 1). Severe back pain with prominent lumbar muscle spasms and cramps was a typical sign. All kinds of activity, even coughing, aggravated muscle spasms and the pain was completely disabling. Because of spasticity, the back was stiff and very tender upon palpation. Most of the pain radiated to both lower extremities, but was no longer segmental. The body temperature was slightly elevated for only a few days. In the neurological examination, straight leg raising was clearly limited and exceedingly painful. Motor and sensory findings remained constant. There was no paresis of urethral or anal sphincters.

All operation wounds healed well, except in one patient (Case 1), who developed apparent superficial infection due to *Staphylococcus aureus*. The wound healed following drainage. Three or more blood cultures were taken from all patients with negative results. Case 3 was reoperated and the culture from the interspace was negative.

A regular rise of the erythrocyte sedimentation rate was obtained in the laboratory studies (Table 2). A distinct rise of the white cell count was seen in two cases, but the differential leucocyte count remained normal. In one case, the value of alkaline phosphatase was mildly increased.

Table 2. Laboratory values in postoperative discitis

Case	Leuco- cyte count (10 ⁹ /l)	Tempera- ture °C max.*	ESR		Weeks between onset of symp- toms and highest ESR
			Before operation	Highest value	
1	24.3	37.0	15	114	2
2	9.2	37.4	3	60	8
3	14.5	38.8	14	139	4
4	9.4	37.1	13	53	4
5	9.9	37.2	11	51	1
6	7.9	38.5	11	115	3
7	9.0	38.0	3	94	5
8	13.4	38.0	10	77	2

* Fever lasted only a few days.

Isotope scanning was done in five patients without any increased uptake.

All patients were examined with plain lumbar radiography and tomography. Six patients underwent lumbar CT from 3 weeks to 3 months after operation.

End-plate resorption occurred in all patients but one, and disc space narrowing occurred in all. Late osteophyte formation was found in only one case. The onset of end-plate resorption varied. In Case 2 it was apparent 4 months after operation, while in Case 5 it appeared 3 weeks after operation but before disc space narrowing. The resorption was more distinctly displayed in tomography than in the plain films (Figure 1). The narrowing of the disc space was apparent in Case 8 at 3 weeks, and in the others at 2–2.5 months after operation.

In five patients CT was performed during the recent phase, 3–4 weeks from operation, and in one patient, following a 3-month interval. Hypodense disc material was noted in all recent phase studies. The density varied from 30 to 50 Hounsfield units (HU). Our apparatus (Somatom 2 whole body scanner) shows normal disc material values from 70 to 90 HU. In the control CT of one patient, the disc showed degenerative changes with vacuolization several months later (Figure 2A).

Treatment

All patients were placed on bedrest until movement was possible without aggravating pain. The patients began to walk with the aid of crutches. Analgesics were used as needed. The wound culture of Case 1 showed *Staphylococcus aureus*-sensitive erythromycin, and the patient was started on that treatment. Case 2 was treated with a sulphonamide-trimethoprim combination, and the rest of the patients with cloxacillin.

Even though postoperative symptoms of discitis disappeared in 3–4 months in each case, some pain remained. Case 1 was given a pension due to chronic backache. Case 3 returned to work 3 months after operation. The others returned to work 5–7 months after operation.

Discussion

The incidence of unsuccessful lumbar disc surgery is about 6 per cent (Cauchoix et al. 1973), and the incidence of postoperative discitis is estimated to be under 1 per cent, though Pilgaard (1969) found an incidence of 2.3 per cent. An incidence of 0.73 per cent was found in our study during a 10-year period. Within the last 2 years, we have had six cases of discitis, and only two cases before that. Whether this is due to better diagnosis or an increased incidence of discitis is not known.

The possibility of postoperative discitis should be kept in mind, especially when severe backache and spasm occur postoperatively (Sullivan et al. 1958, El-Gindi et al. 1976) and when there is an increased erythrocyte sedimentation rate. The first symptoms may appear weeks or months after operation (Lang 1968), or they may appear within a week (Thibodeau 1968), as in one of our cases. In the present series, most of the symptoms started within 2–3 weeks. The absence of elevated body temperature and normal healing of lumbar incision does not exclude discitis.

All the patients had narrowing of the affected disc space and all but one had end-plate resorption, which are common signs (Epstein 1969). The sequence of the onset varied. The appearance of resorption or narrowing can be expected in 3–4 weeks after operation in suspected discitis, but the delay may be longer. Because end-plate resorption was seen more prominently in tomography than in plain films, tomography is recommended. We have not seen reports on CT findings in the diagnosis of discitis. All our patients examined in the early phase had hypodense disc material. Hypodensity is a common sign of edemic tissue. We feel that the role of CT may be significant in the early diagnosis of discitis, but further investigation is needed.

The etiology of postoperative discitis is generally regarded as bacteriological. In some materials (El-Gindi et al. 1976), the etiological bacterium has been cultured in material excised from the intervertebral space at operation. The hematoma and necrotic tissue caused by the operation act as a favourable culture medium. The infection may then spread to the

remaining disc material (Thibodeau 1968, Pilgaard 1969, El-Gindi et al. 1976). In the present series, however, there was no clear evidence of bacteriological infection: there was only a slight increase in body temperature for a few days, a negative culture finding in disc material (taken from only one patient) and a negative blood culture. Traumatization of the intervertebral disc during surgery and vascular disturbance of vertebrae have been regarded as possible causes of aseptic inflammation (Sullivan et al. 1958, Lowman & Robinson 1966, Lindholm & Pylkkänen 1982). Autoimmunization may be another possible factor. On the other hand, the extremely good response to antibiotic therapy seen in our cases relates to low-grade infection. However, the etiology of discitis remains unclear.

All our patients were treated with antibiotics. According to some authors (Thibodeau 1968), antibiotics should be continued until the sedimentation rate is normal, while others consider 3–4 weeks of therapy to be adequate (Lang 1968). In one of our cases, cloxacillin was discontinued 3 weeks after the onset of symptoms, but the symptoms quickly returned. The same antibiotic was resumed and the result was good. We feel that the length of therapy should not be limited categorically, but should depend on clinical response. An operation for discitis is necessary only when the antibiotic therapy has failed.

The prognosis of postoperative discitis is usually good, because it seems that the inflammation is self-limiting. Most patients return to

their former work, as did seven of our patients. One of our patients received a pension for persistent back pain.

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