症 例

VERTICAL SPLIT FRACTURE OF THE FIFTH LUMBAR VERTEBRA REPORT OF A CASE

by

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The vertical split fracture of the vertebral body is not a common clinical entity. We wish to present our experience with a case of vertical split fracture in the sagittal plane of the fifth lumbar vertebra.

CASE REPORT

A sailor, twenty-one years old, was of strong body structure from the birth forward, always healthy, and historically neither trauma on the lumbar region nor low back pain. When his ship rolled, he sustained a direct blow on the lumbar region of his forward bending back from a heavy object. Soon after the injury he could neither stand nor walk on account of the low back pain. He was first treated by a doctor as emergency measures with analgetica and application of Exihos, and seen by us with complaint of sevear low back pain in three weeks after the injury. Physical examination on admission showed a diminution of lumbar lordosis, spasm of the bilateral erector spinae, total limitation of active movement of spinal column and marked localized tenderness of spinous processes of the fifth lumbar vertebra. We could not find the disturbances of motion, sensibility,

Fig. 1, a

Fig. 1, b

urinary bladder and defecation, and radicular signs. He was able to stand without support, and walk slowly with slightly forward bending back. Nothing was abnormal labolatory findings of blood and urine. Roentgenogramm revealed a vertical split with very slightly left curve in the sagittal plane and double layers in the ventral margin of the body of the fifth lumbar vertebra. (Fig. 1. a, b)

He put to bed with continuous traction with 6. kg. applied to pelvis for two weeks, and had in plaster immobilisation of the spine for three weeks, and then has been corsetted. At the time of writing, three monthes after the injury, the patient had no low back pain but had slight tenderness over the spinous processes of the fifth lumbar vertebra.

DISCUSSION

According to all reports about statistic distribution of fractures of vertebral bodies ("Glorieux-Fracture"), the lower lumbar vertebra is a very unvulnerable part. The ration of the fracture of the fifth lumbar vertebra (L-5) is 1% by ROB, and 1.08% by ROWE who reported about 237 fractures of the spine in the patient over the age of 60 in 1963. Our own clinical statistics in last a year and six monthes between January 1962 and June 1963 shows that the patient with Glorieux-fractures was 118 patients (2.18%) of all 5426 outpatients, and the number of fracture of L-5 was two (1.5%) in 134 fractured spine. (Table 1)

TABLE 1

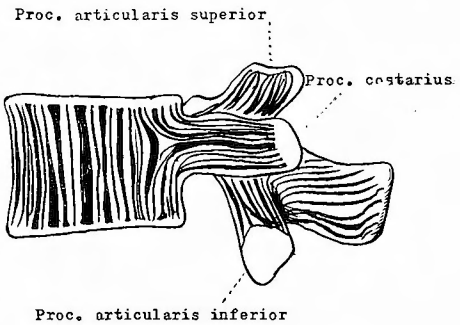
(Orthopedic Clinic of Yamanaka National Hospital)
Number of all outpatients between Jan. 1962 and Jun. 1963 5425
Number of patients with Glorieux-fracture 118

Distribution of fractures of vertebral bodies

Vertebra Number	Number of Fractures
T-5	3
T-6	1
T-7	4
T-8	5
T-9	7
T-10	4
T-11	8
T-12	27
L-1	37
L-2	20
L-3	11
L-4	4
L-5	2
Total	134

The fractures of vertebral bodies are classified into three groupes ; wedge compression fractures, comminuted fractures and fracture-dislocation (WATSON JONES). In 1961 an unusual case which, about 35 years old labour, fractured vertically in the coronal plane of L-5, was reported by JAMES. ROWE (1963) reported two cases of vertical split of the spine in the aged. Thus, according to ROWE's report, the fractures of vertebral bodies are divided into six types ; a chip, wedge, vertical split, "codfish", horizontal and comminuted.

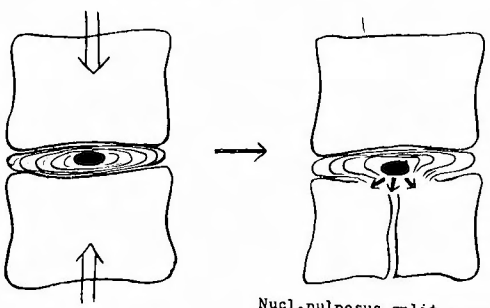
It is an established fact that the vertical fracture is not a common type. Now, we may make out that the rareness of the vertical fracture has had much to do with so called "Spaltlinie" of vertebra. Considering from the functional structure, particulary the "Compactaarchitektur", of bone, the fracture line is produced as a rule to meet at right angles with "Spaltlinie". In case of lumbar vertebra, the "Spaltlinie" is illustrated in Fig. 2. So that the vertical fracture of the vertebral body is no more usual than that of the long bone is common.



"Compacta-Architektur" of lumbar vertebra.
"Spaltlinie".
(by Benninghoff-Goerttler)

Fig. 2

ROWE descrived that vertical fracture through the vertebral body might be produced by the pressures on the end plates of an intact nucleus pulposus. And it was suggested by JAMES that vertical loading of spine might fracture the superior vertebral plate of the vertebra and caused the nucleus pulposus to be driven into the vertebral body, therby splitted it. The intact nucleus pulposus consisted with gelatinous liquid is elastic, tense, incompressible and confirmed by annulus fibrosus. On affecting the vertical loading of the spine by some trauma, the nucleus pulposus may split open the end plate to suffer a vertical fracture of the vertebral body. (Fig. 3)



Vertical loading of the spine.

Nucl.pulposus split open the end plate to suffer a vertical fracture.

Fig. 3

Roengtenologicaly we are able to diagnose as a vertical fracture of the vertebral body without any effort. But in case of the vertical fracture in the sagittal plane it is need to

be differentiated from Rachischisis anterior. Rachischisis anterior differ from the vertical fracture in sagittal plane of the vertebral body in the respects that is accompanied with another congenital deformity in nervous system or the organs within abdominal cavity, has wide breadth and characteristic shape of the vertebral body as "Schmetterlingswirbel", and can not be united osseously forever.

SUMMARY

A case confined a vertical split fracture in the sagittal plane of the fifth lumbar vertebra by X-ray examination has been reported.

So far as we have been able to observe, the vertical fracture of the vertebra is not common, and according to the literature on this subject, this injury is produced by the nucleus pulposus bursting through the vertebral end plate.

(The author is grateful to Dr. Hiromu Ito and Dr. Kazuo Matsuda for their advice and revision.)

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和 文 抄 録

第5腰椎縦骨折の1例

国立山中病院整形外科（指導：伊藤　弘院長）

中　村　敬　而

21才男，船員．船にローリングが起こり脊柱前屈位をとつた際に腰部に重量物が落下し，レ線学的に第5腰椎々体の矢状面における縦骨折を認めた1例を報告した．

縦骨折が稀である理由を，脊椎骨の機能的構築特にその緻密質の構築に求め得ると考える．発生機転は，外傷により脊柱軸方向に力が作用する時髄核が線維輪を破り終板を介して椎体に力を及ぼすことによるものである．鑑別を要する疾患としては前部脊椎披裂があるが，これはレ線学的に容易に鑑別し得る．