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The natural history of the osteoporotic vertebral fracture

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SUMMARY *The clinical picture of the osteoporotic fractures of the spine presents an heterogeneity in their intensity and duration. In 210 cases of osteoporotics with acute pain and radiological evidence of spinal fracture we separate their clinical picture in two groups. In Type I (121 cases) pain is acute and severe, improving gradually; the vertebral wedging is obvious from the beginning and remain unchanged. The duration of this event exceeds 4-8 weeks. In Type II (89 cases) pain is less and of shorter duration, but after 6-16 weeks a new attack of acute pain presents. This picture can be repeated for 6-18 months. Radiologically the fracture is not clear during the first attack but wedging gradually developed during the next months. Bone density of the lumbar spine (DPA) was measured in all cases. Type I had a significantly lower BMC than Type II. We suggest that patients with unclear vertebral fractures, minor symptoms and relatively high bone mass must classified in Group II and deteroriation can occur during the next months. Long term treatment and additional orthopaedic prevention is needed. In Group I a short term calcitonin treatment helps early relief and mobilization.*

Key words: Osteoporosis, Vertebral Fracture, Bone Density

INTRODUCTION

Acute pain of the dorsal or lumbar spine in osteoporotic patients is generally due to vertebral fractures. The clinical picture of these fractures is described in the literature in a rather unclear way (5). Generally, it seems that the intensity and the duration of the pain differs from case to case (3,4). On the other hand, many osteoporotic vertebral fractures develop silently and they are discovered later, when kyphosis and obvious diminution of stature is present (5,10). It is, however, noticeable that the clinical characters are quite similar in some groups of patients and therefore an heterogeneity of the clinical picture exists. The purpose of this work is to study the clinical features of the vertebral fractures and compare them with their radiological picture and the quantity of their bone mass.

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MATERIALS AND METHODS

210 postmenopausal women with a recent non-traumatic vertebral fracture were included in the study. All diseases producing similar fractures as multiple myeloma, metastatic carcinoma etc. were excluded. Ages ranged between 55-78, with a mean of 67 years. Evaluation of their clinical condition was done ev-

ery month, but during the period of severe pain these patients were hospitalized and observed daily. Pain was estimated on the visual analog scale (V.A.S.) ranging from 0-10. Cases with an initial pain more than 5 cm were included. A lateral radiograph of the dorsal and the lumbar spine were done on admission and they were repeated every six months or in case a new acute pain was noticed. The deformity of vertebral fracture was done with the method of Meunier and Vignon (11).

Measurement of the lumbar spine bone mass was performed 4-6 weeks following the initial crisis with a DP3 Lunar dual photon absorptiometer. The whole period of observation of these patients was 18 months.

Patients were divided in two groups. In the first group were included women with acute pain and radiological evidence of a fully collapsed vertebra which was considered to be responsible for the acute pain (recent fracture). This group consisted of 121 women with an age range from 58-78 and a mean age of 67. In the second group were included women (89 patients with an age range from 55-68 and a mean age of 60) with an acute back pain but with a radiological evidence of a mild vertebral fracture (usually of the upper epiphyseal plate of the vertebra) or with no signs of vertebral fracture.

Comparisons of the two groups were carried out by independent sample t-tests.

RESULTS

Some of the characteristics of the two patient groups are shown in Table I. A distinction between these two clinical types is obvious. Women included in the first group (Type I) had only a single acute attack of short duration (6 weeks ± 1.8). The severity of the pain was greater than in Type II (9 ± 0.2). The patients of this group were generally older (67 years ± 7.8).

Patients of Type II (89 cases) had a different fracture history. The number of consequent attacks of acute pain was bigger (3 ± 1.05) and therefore the whole duration of time necessary for the fracture to be completed was long (49 weeks ± 12.3). On the other hand the pain of each attack was less than in Type I (6 ± 1.8), and in fact many times the patient suffered the pain without referring it to the doctor. Age of the patients of Type II was generally lower than in Group I (60 ± 4.6). All differences between the two groups were found to be statistically very significant.

In Table II the vertebral deformity found radiologically in each acute painful attack is shown. All cases of Type I (121) developed a complete vertebral collapse immediatelly af-

Table I *Characteristic of the fracture groups*

	Type I	Type II	P
Age (years)	67 ± 7.8	60 ± 4.6	<0.001
Number of acute attacks	1	3 ± 1.05	<0.001
Pain score during acute fractures	9 ± 0.2	6 ± 1.8	<0.001
Duration of the whole development of the vertebral fracture (weeks)	6 ± 1.8	49 ± 12.3	<0.001

Table II *Vertebral deformity at the time of the acute pain*

Painful attack	Type I			Type II				
	1st	2nd	3rd	1st	2nd	3rd	4th	5th
Wedging (3 according to Meunier	0	0	0	53	18	12	0	0
Collapse (score 4 according to Meunier	121	0	0	0	22	42	23	2

ter the initial painful crisis. Radiological findings in the other group was more complicated (89 cases). All cases gradually proceeded from a vertebral wedging (grade 3 according to Meunier et al) to a full collapse of the vertebral body (grade 4). In only 22 cases this event was completed during the second painful attack, in 42 during the third, in 23 during the fourth and finally in 2 cases the vertebra collapsed on the fifth painful attack.

In Table III bone mass of the two groups is presented. BMD was found significantly lower (0.658 ± 0.105) in Type I, while Type II reserved a higher BMD (0.834 ± 0.89). It is of course noticeable that patients of Type I were approximately 7 years older than patients of Type II and therefore a deteroriation of bone density was expected, but in a smaller degree.

DISCUSSION

Vertebral fractures are very common in osteoporosis (3,5,7,9,10,12). Although the clinical picture is mainly characterized by acute attacks of pain, little attention has been shown to this parameter (4,5,10,12). More authors have studied the frequency of these fractures (5), the relation of that to bone mass with the method of single or dual absorptiometry (1,2,8,9,12) or bone histomorphometry (7,9) and finally the characteristics of bone deformity (3,11). Pain is also studied but not only in relation to the vertebral fracture (4,12).

From this study an heterogeneity of clinical picture of the vertebral fractures is concluded. This difference is related to the history of the development of the fracture from the beginning until the complete collapse of the vertebra. Two clinical types can be described related to vertebral density and strength. In Type I an extremely osteoporotic vertebra in an aged patient usually after a little violence or not collapse in a very short time. Pain produced from this event is extreme but with a rather short duration (4-8 weeks). Therefore, the natural history of this type of fracture is exhausted after the initial painful attack. The study shows that this type of osteoporotic fracture is the commonest (121 cases). Bone mass of the spine of these patients is usually very low (BMD).

In Type II the fracture happens in a relatively younger postmenopausal woman with a spinal bone mass (BMD) higher than in Type I. The vertebral deformity is developed gradually in steps of acute painful attacks of less severity than in Type I. In fact radiological evidence of fracture of the vertebra may not be presented during the first attack and this clinical picture probably should be interpreted as a simple back pain. Usually wedging of the upper epiphyseal plate is found on the initial or the second attack. This wedging is followed by a new painful attack and full collapse of the vertebra. Total period of the whole story can be extended to 18-20 months.

If the fate of the Type I fracture is definitely the full collapse, one can imagine that the game is played differently in Type II. The vertebra is rather strong and if further bone loss is prevented and the patient avoids violence and strengthens his muscular system, the collapse can be avoided.

CONSIDERATIONS OF MANAGEMENT OF THE ACUTE OSTEOPOROTIC VERTEBRAL FRACTURES

From our experience in managing these two clinical types of vertebral fracture a planned treatment could be as follows: 1) in patients with a rather advanced age, severe acute pain, full collapse of the vertebra and low bone mass clinical Type I is easy to be diagnosed. Treatment of the acute pain and early

Table III *Spinalbone density (BMD) of the fractured patients*

9/cm2	Type I	Type II	P
BMD (L2-L4)	0.658 ± 0.105	0.834 ± 0.89	<0.001

mobilization of the patient in essential. Our practice is to administer a daily injection of 100 UI of salmon calcitonin for one month. This therapy is usually effective for the patient. A chronic treatment for a period of a least two years is then planned. 2) In relatively younger patients, without full vertebral collapse, a rather silent symptomatology (less pain during the acute phase) and higher bone mass (BMD) Type II is most possible. That means that the patient is a candidate for new acute painful attacks in the future, gradual deformation of the vertebra until its full collapse. All these events can last for a long period of time, exceeding the 20 months. Our philosophy in a case of Type II fracture is to plan from the beginning an intense treatment for a period of 18 months. Salmon calcitonin 100 UI every alternative day and high calcium intake for two months, followed by two other months without calcitonin, and after that repeat the calcitonin for another two months has proved to be an efficient treatment able to diminish the frequency of new fractures (10). Additional orthopaedic measures can be taken. Special orthopedic belts in association with physiotherapy and exercise of the body musculature is planned.

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