

BONE MINERAL CONTENT IN PATIENTS WITH MYASTHENIA GRAVIS TREATED WITH CORTISONE

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Bone mineral content (BMC) was measured in 23 patients with myasthenia gravis using the ²⁴¹Am gamma ray attenuation method. Measurements were performed in the proximal (BMC₆) and distal (BMC₁) parts of the forearm, i.e. at 6 and 1 cm distance from the styloid process of the ulna in supine position. At 6 cm from the styloid process the bone is mostly compact, whereas at 1 cm distance it is mostly trabecular. The results were compared with the BMC values in age and sex matched controls. No signs of major bone loss were noticed in any of the myasthenic patients examined in spite of prolonged administration of fluorocortolone.

The osteoporosis induced by corticosteroids is well documented (1-3). Corticosteroids exert a negative effect on the skeletal system causing bone loss. They seem to diminish calcium absorption from the small intestine consecutively lowering collagen synthesis and formation of bone tissue. Bone mineral content was measured in the forearms of patients suffering from myasthenia gravis who were treated with fluorocortolone orally. The values were compared to those determined in a healthy Yugoslav population (4).

PATIENTS AND METHODS

Twenty-three patients were examined in this preliminary study. They suffered from myasthenia gravis which had been verified clinically and in the laboratory. They were 18 women aged 18-67 years and five men aged 41-60 years. The patients received an average dose of 50 mg fluorocortolone every other day (HSDAS pattern) (2,3). The treatment lasted from 1 to 120 months.

For BMC determination the method of *Cameron and Sorensen* (6) modified by *Nilsson* (7) was applied. A gamma absorptiometric densitometer (Gambro, Sweden) equipped with a scintillation detector, a single-channel analyser and a WANG 600 calculator was used (8).

The coefficient of variation reflecting the reproducibility and precision of the method was 4-6 per cent for the distal (BMC_1), and 3-5 per cent for the proximal (BMC_6) measurements (5). Our instrument was equipped with an ^{241}Am isotope source (1665 MBq with a gamma ray energy of 60 keV) and operated as a low dose instrument (9).

RESULTS

Results of individual measurements are presented in Figures 1 and 2. The BMC values are plotted against age (years) and compared with the age matched control values obtained earlier (4). All the values are within 2 SD but less than 3 SD of the average

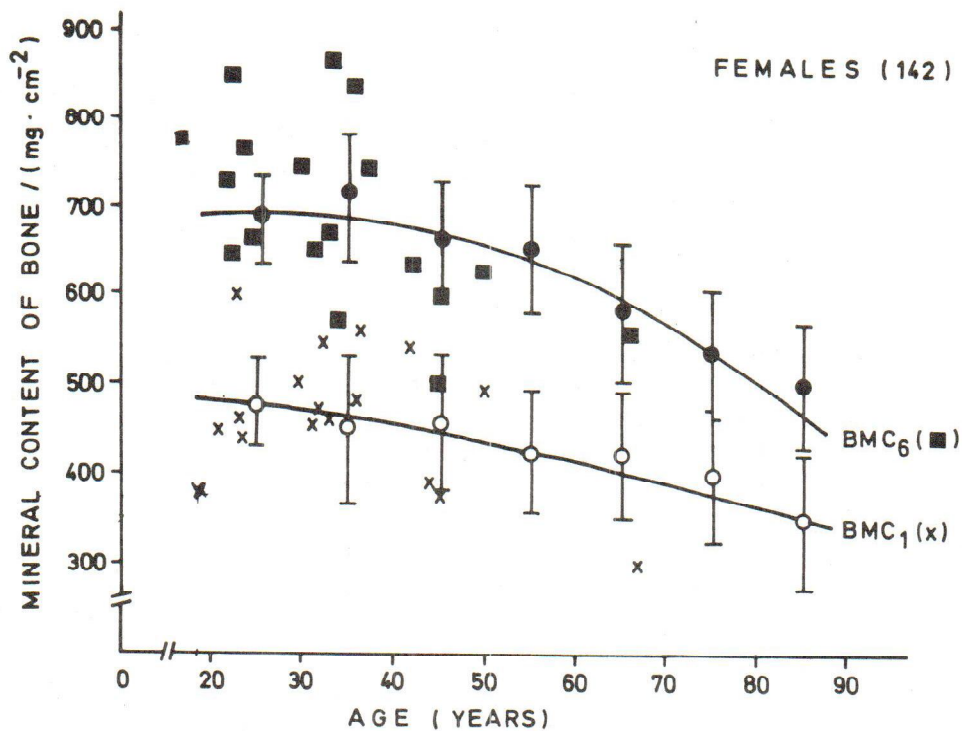


Figure 1 The second-degree regression curves and the means ± 1 SD of normal BMC values in females (4). Individual BMC values in the forearm of myasthenic patients (females) plotted against age

control values at both measuring sites (BMC_1 and BMC_6). The Table shows relevant data for each patient (age, height, body weight, duration of therapy, BMC_1 and BMC_6 values).

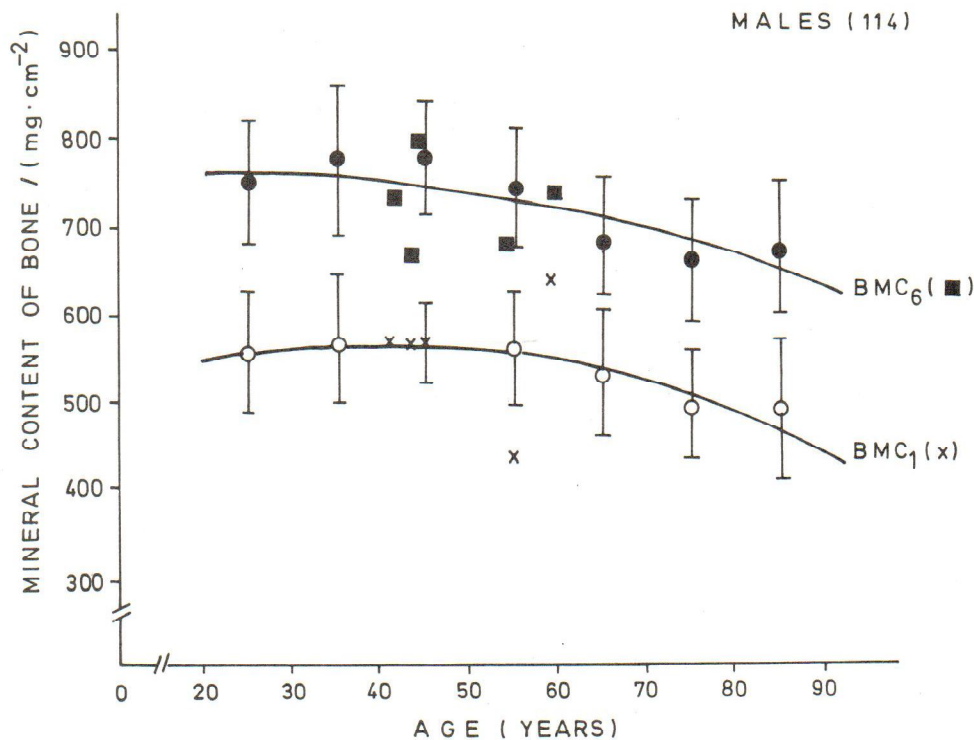


Figure 2 The second-degree regression curves and the means ± 1 SD of normal BMC values (4). Individual BMC values in the forearm of myasthenic patients (males) plotted against age

DISCUSSION AND CONCLUSIONS

A prolonged corticosteroid therapy can have a negative effect on the bone. It may cause a reduction in bone mineral and in organic bone matrix (osteoporosis) i.e. a decrease of bone mass or a disproportionate lack of bone mineral (osteomalacia). Metabolic bone disease can have elements of both. In most cases the loss of bone mass is persistent and irreversible. Generally, osteoporosis involves loss of trabecular bone rather than that of cortical bone. Therefore BMC measurements in the distal part of the ulna containing fairly large amounts of trabecular bone are preferable to those in the midshaft containing rather little trabecular bone. Measurements at the distal end of the forearm, however, require special precautions, because BMC in this part varies

Table 1
Bone mineral content (BMC) in myasthenic patients during or after corticosteroid therapy

	Age years	Height cm	Body weight kg	Duration of therapy months	BMC ₁ mg/cm ²	BMC ₆ mg/cm ²
males						
1.	41	185	75	1	588	727
2.	44	165	66	1	587	670
3.	47	172	59	1	577	796
4.	60	183	93	10	633	756
5.	57	171	92	24	418	674
females						
1.	45	169	43	1	393	599
2.	24	161	62	10	439	669
3.	31	167	61	10	477	644
4.	22	158	50	10	397	637
5.	21	162	52	1	452	714
6.	46	162	60	2	382	499
7.	32	158	63	12	469	581
8.	32	168	63	10	543	690
9.	50	162	96	6	499	610
10.	23	167	67	3	467	772
11.	67	158	62	3	302	571
12.	37	173	80	1	488	733
13.	30	167	55	12	507	748
14.	35	155	55	6	571	827
15.	41	164	92	96	558	628
16.	23	161	77	12	594	676
17.	21	158	60	36	658	865
18.	18	178	62	3	366	773

noticeably from one measuring site to the next (3). The time needed to detect significant differences between measurements is directly proportional to their standard deviation (4).

Bone mineral content largely determines bone strength. The BMC of the peripheral skeleton is conveniently determined with a high degree of precision by single-photon absorptiometry. However, large and varying amounts of soft tissue interfere with the measurement of the axial skeleton. For this reason in a BMC laboratory a dual technique is used whenever possible to eliminate soft tissue interference.

The correlation between the forearm BMC and the total body calcium appears to be reasonably good in normal subjects (10) but less good in osteoporotic patients (12).

According to the results of the present study there is no pathological shift of bone mineral content in spite of prolonged fluorocortolone administration. This is an interesting finding indicating that long-term treatment with cortisone does not always

induce loss of bone mass. However, more patients should be examined and more central bone density (spine) measurements performed before making final conclusions.

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Sažetak

SADRŽAJ MINERALA U KOSTIMA MIJASTENIČARA

Sadržaj minerala kosti (BMC) podlaktice mjereno je metodom atenuacije (gašenja) gama zraka ^{241}Am u 23 pacijenta (18 žena i 5 muškaraca). Sadržaj minerala u kosti određivan je u proksimalnom (BMC_6) i distalnom (BMC_1) dijelu podlaktice. Rezultati mjerenja uspoređivani su s BMC vrijednostima odgovarajućih dobnih skupina normalne populacije. Nisu zapaženi znakovi značajnijeg gubitka kosti kod osoba oboljelih od mijastenije gravis unatoč produženoj terapiji fluorokortikosteroidima.

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