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Surgical treatment of primary hyperparathyroidism in the elderly

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Summary and conclusions

Twelve patients aged over 70 with primary hyperparathyroidism (persistent hypercalcaemia and raised serum parathyroid hormone concentrations) underwent parathyroidectomy, which was well tolerated by all. After operation serum calcium concentrations returned to normal and the commonest symptoms before operation (muscle weakness, malaise, and mild to severe dementia), although not related in severity to the degree of hypercalcaemia, improved. Mental function was greatly improved.

The findings suggest that primary hyperparathyroidism should be sought in any elderly patient with hypercalcaemia and that more such patients with the diagnosis should be considered for parathyroidectomy irrespective of age.

Introduction

Biochemical screening detects many cases of hyperparathyroidism that would otherwise go unrecognised. Most show no evidence of bone disease or renal disease. The commonest group of patients with hyperparathyroidism presenting at our

clinics complain of muscle weakness, tiredness, and general malaise. The next commonest group are patients who appear to be completely asymptomatic but in whom hypercalcaemia is found by chance during investigations for other problems. With the increased recognition of the disease, many elderly patients have been found to have hyperparathyroidism. In such patients the non-specific nature of the symptoms may readily be attributed to "aging," and the decision to operate may be difficult. We report our experience of parathyroidectomy in 12 patients aged 70 or over, which encourages us to recommend operations in symptomatic patients in this age group.

Patients, methods, and results

The table gives the details of the 12 patients. The commonest symptoms were muscle weakness, mental slowing, and decreased mobility. Before operation, three of the patients (cases 2, 7, and 8) were unable to manage at home and were awaiting long-term hospital care, while two others (cases 5 and 11) were able to live at home only because of considerable attention from relatives living in the same house. Another patient (case 6) had been transferred to sheltered accommodation before operation. In all 12 patients the hypercalcaemia was discovered during routine biochemical investigations for assessment of deteriorating physical state or for completely unrelated medical problems. Hyperparathyroidism was diagnosed when persistent hypercalcaemia was present with raised serum parathyroid hormone concentrations. No patient showed radiological evidence of the disease. At operation a single parathyroid adenoma was found in all cases except case 10, in which two adenomas were removed at separate operations. Successful removal of the adenomas was associated with rapid return of the serum calcium concentration to normal. The operation was well tolerated by all the patients, and no serious complications occurred. Only one patient (case 5) developed severe symptomatic hypocalcaemia. Although mild asymptomatic hypocalcaemia often occurred after operation, all patients eventually achieved normocalcaemia without long-term treatment with calcium supplements or vitamin D.

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Clinical characteristics, serum biochemical indices before operation (given as range of values, or as only value), and history in 12 elderly patients with primary hyperparathyroidism

Case No	Age and sex	Biochemical indices					History	
		Calcium (mmol/l)	Phosphate (mmol/l)	Alkaline phosphatase (KA units/dl)	Urea (mmol/l)	PTH (μ g/l)	Before operation	After operation
1	75, M	3.0-3.4	0.5-0.7	7-13	5.5-7.4	1.1*	Diabetes mellitus, poor control.	Improved memory. More active.
2	73, M	4.8		10-12	11.0-26.0	1.1†	Poor memory. Muscle weakness	No change in diabetic control
3	71, F	3.0-3.3	0.6	11-18	8.1-10.2	3.8*	Mentally confused. Incontinent.	Complete recovery. Living at home
4	72, M	2.6-3.2	0.7-0.8	9-13	6.0-18.0	2.2*	Unmanageable at home	More alert and mobile.
5	72, M	3.0-3.5	0.9	9-10	11.0-15.0	3.3*	Headache. Amnesia. Muscle weakness. Difficulty in walking	No headaches
6	78, F	2.9-3.0	0.8	47-55	8.9-19.8	3.8†	Diabetes mellitus. Hiatus hernia. Duodenal ulcer with haematemesis	Reduced insulin requirements
7	83, F	2.6-2.9	0.8-1.1	10-11	8.7-11.1	0.5†	Slurred speech. Muscular weakness. Vague aches and pains	Improved muscle strength and wellbeing
8	70, F	3.0-3.4	2.1-2.4	16-21	26.0-40.0	3.6†	Muscle weakness. Agitation and anxiety. Difficulty in walking	Improved muscle strength and wellbeing. More active.
9	81, F	2.5-2.7	0.8	9-13	5.9-8.7	0.8†	Progressive dementia. Unmanageable at home	Remained anxious
10	70, F	2.7-2.9	0.8-1.0	6-10	4.7-6.7	1.5†	Dementia. Muscle weakness. Unable to walk. Unmanageable at home	Complete clearing of dementia. Increased muscle strength.
11	75, F	2.6-2.7	1.1	12-16	15.4-20.3	4.0†	Muscle weakness. Difficulty in walking	Living at home
12	76, F	2.9-3.0		12-16	5.4-7.8	1.8†	Profound tiredness. Muscle weakness	Considerable mental improvement. More mobile. Improvement in wellbeing. Living at home
							Progressive dementia for one year	More mobile. Improvement in wellbeing
							Thirst. Muscle weakness. Renal stone and myocardial infarction	Condition much improved. More energetic and active
								Considerable improvement in dementia. More ambulant
								Condition much improved. More active

*Assay performed by suprarregional assay service—normal values $<1.0 \mu$ g/l.

†Assay performed by local laboratory—normal values $<0.2 \mu$ g/l.

Conversion: SI to traditional units—Calcium: 1 mmol/l ≈ 4 mg/100ml. Phosphate: 1 mmol/l ≈ 3.1 mg/100 ml. Urea: 1 mmol/l ≈ 6 mg/100 ml.

After operation the symptoms improved in 11 of the 12 patients. Most reported considerable improvement in wellbeing. One patient (case 10) reported no improvement after her first neck exploration despite initially being unaware that her calcium concentration had not returned to normal. After removal of the second adenoma her calcium concentration returned to normal, and she noted a definite improvement in wellbeing. All 10 patients with muscle weakness improved, resulting in increased mobility and activity. Mental function was considerably improved. All three patients with severe mental impairment improved, although one (case 11) continued to have some impairment of both short-term and long-term memory.

Discussion

Hypercalcaemia is usually due to either primary hyperparathyroidism or malignancy. We find that when due to malignancy it is associated with disease that is relatively obvious on examination; in our assay serum parathyroid hormone concentrations are usually undetectable.

Hyperparathyroidism was diagnosed easily in these patients once the hypercalcaemia was detected, owing to the absence of obvious malignancy and the presence of raised hormone concentrations. The main difficulty was in deciding whether the patients would benefit from parathyroidectomy. In one patient with severe hypercalcaemia (case 2) the decision was easy, but in six of the 12 patients the serum calcium concentration never exceeded 3.0 mmol/l (12 mg/100 ml). There was poor correlation between the severity of symptoms and degree of hypercalcaemia. One of the most impressive clinical improvements was seen in the patient with the mildest hypercalcaemia (case 7). The hypercalcaemia was initially thought to be unrelated to her progressive dementia, and a conservative policy was followed for two years. Only when she became impossible to manage at home and after considerable prompting from her general practitioner was an operation performed with dramatic beneficial results; because of this an operation was recommended in case 11, in which the severe dementia seemed disproportionate to the mild hypercalcaemia. Although recovery of mental function was not complete it was sufficient to enable her husband to have normal conversations with her for the first time in over a year. This recovery and her improved mobility removed the immediate need for consideration of long-term hospital care.

Apart from the 12 patients reported on here we have seen several others in this age group with similar biochemical results

and apparently few or no symptoms of the disease. Whether such patients will require operations in the future remains to be seen.

Most large published studies of hyperparathyroidism do not include a high proportion of elderly patients. Pyrah *et al.*,¹ reviewing available reports, noted that only 18 out of 890 patients were aged 70 or over. These elderly patients were predominantly women. More recent reports, however, have begun to show an increased proportion of elderly patients, which presumably reflects the increased use of biochemical screening. In a series of 147 asymptomatic patients, 21 (14%) were aged 70 or over.² Similarly, Freidin³ reported that nine out of 84 patients were aged 70 or over. Of more importance is the report by Peskin *et al.*,⁴ in which 17 of the last 40 consecutive cases of hyperparathyroidism proved by operation were over 69, and 12 of them were women. Our findings confirm this high proportion of elderly female patients with hyperparathyroidism.

Few reports on the results of operations for hyperparathyroidism have been concerned specifically with elderly patients. Riddick⁵ reported on 19 patients over 59 years who were treated by operation, but only four were over 69. Biochemical screening was not then widely available and, not surprisingly, most patients had either bone disease or renal stones. Ten of the 19 also had lethargy, weakness, or mental changes, which, on the whole, improved rapidly after operation. Davidson *et al.*⁶ described a single patient, aged 86, who was successfully operated on and whose symptoms were weight loss, weakness, difficulty in swallowing, nausea, and vomiting. The findings most similar to ours were those of Alveryd, *et al.*,⁷ who described 30 patients aged over 70 treated by operation for hyperparathyroidism. Neuromuscular symptoms, fatigue, or mental symptoms predominated in half of the patients. Seven of the eight patients with neuromuscular symptoms improved after operation, as did two of the three patients with extreme fatigue. The three patients with severe mental symptoms did not improve. Peskin *et al.*⁴ further emphasised the prevalence of mental symptoms in their 17 elderly patients, in whom renal stones were also uncommon. Response to operation in their patients was excellent: all showed improved mentation and wellbeing and were less subject to fatigue. Operative mortality was nil and morbidity low.

Successful treatment by operation in such patients, who are usually frail, is helped by an expeditious atraumatic exploration of the neck by surgeons with considerable, regular experience of the operation. A search is made of the areas where adenomas

commonly occur in an attempt to identify an adenoma and at least one normal gland. Virtually all the adenomas are accessible through a cervical incision, and the sternum should not be split at the primary exploration. The surgical task is much facilitated by working with an anaesthetist who is fully aware of the requirements of the operation. There should be a clear airway, controlled ventilation, and normotension. Using these guidelines we find that the operation is well tolerated by these elderly patients, all of whom have had an uneventful post-operative course. There have been no deaths, and the improvement in wellbeing and activity after operation has been striking.

These results encourage us to consider more patients for operation irrespective of age provided that they have symptoms. Hypercalcaemia, however mild, should be investigated, as a preoperative diagnosis of hyperparathyroidism can now usually be made with considerable accuracy. Other reports support our findings that muscle weakness, lethargy, and general malaise respond well to correction of the hyperparathyroidism, but our present findings suggest that improvement in dementia may be more common than other reports indicate.

Although the improvements in our patients were predominantly subjective, they were enough to prevent three of the patients from being admitted for long-term hospital care. The improved mobility also allowed several of them to manage

shopping and other domestic duties. As more and more elderly patients are found to have hyperparathyroidism it will be important to try to devise more objective methods of assessing their response to treatment.

We thank Dr M Waite for permission to include case 11.

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Cutaneous microcirculation in systemic sclerosis and response to intra-arterial reserpine

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Summary and conclusions

The cutaneous microcirculation in the hand was measured in 23 patients with systemic sclerosis, 19 with Raynaud's phenomenon and four without Raynaud's phenomenon, and 20 controls. The patients with Raynaud's phenomenon had a reduced basal blood flow and an exaggerated further reduction on local cold stimulation, though both were normal in patients without Raynaud's phenomenon. Reflex-induced vascular changes by cold stimulation of the contralateral hand showed no differences between the three groups. The blood flows were similar in the affected skin of the anterior chest wall in four patients with systemic sclerosis and peripheral Raynaud's phenomenon and matched controls. In the seven most severely affected patients 1 mg of intra-arterial reserpine produced a prompt improvement in the cutaneous microcirculation which usually lasted one to three weeks but occasionally much longer. By judicious use of repeated injection guided by measurements of the microcirculation it was possible to heal indolent ulcers of the fingers.

The results indicate that vascular changes are common in systemic sclerosis but are not fundamental in the

pathogenesis of the disease. More probably there is a general soft tissue abnormality that usually but not necessarily affects the vessels.

Introduction

The clinical features of systemic sclerosis are due to a combination of fibrosis and induration of tissue, vascular obstruction, and ischaemic atrophy. In particular, Raynaud's phenomenon and widespread vessel changes occur in various organ systems. In patients with severe Raynaud's phenomenon peripheral ischaemia leads to gangrene of the digits. There is debate over whether these vascular changes are fundamental in the pathogenesis of systemic sclerosis and initiate the florid tissue changes or whether there is a generalised tissue abnormality around and including the blood vessel walls which causes vascular obstruction. We compared these hypotheses by measuring the microcirculation within the skin and the changes that occur during exposure to cold in controls and patients with progressive systemic sclerosis with and without Raynaud's phenomenon. In those patients with severe Raynaud's phenomenon and peripheral ischaemia the responses of the microcirculation to intra-arterial reserpine were recorded.

Patients and methods

Twenty controls and 23 patients with systemic sclerosis with typical cutaneous features confirmed by biopsy (19 with and four without Raynaud's phenomenon) were studied. The patients with systemic sclerosis showed varying degrees of visceral changes. In particular, the four without Raynaud's phenomenon all had

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