

Vitamin D deficiency after vagotomy

Metabolic bone disease is known to occur several years after gastrectomy.¹ A recent report based on plasma calcium and phosphate concentrations and alkaline phosphatase activity claimed that metabolic bone disease does not occur after truncal vagotomy and gastrojejunostomy.² Since the presence of normal plasma calcium, phosphate, and alkaline phosphatase values does not establish the absence of biochemical osteomalacia³ we decided to investigate the vitamin D (25(OH)D) and parathyroid hormone states of patients with truncal vagotomy and highly selective vagotomy.

Patients, methods, and results

Patients who had undergone surgery for a duodenal ulcer in the previous eight years were invited to attend the metabolic clinic. Twenty two patients responded and were divided into two groups—group 1, eight patients with truncal vagotomy and gastrojejunostomy or pyloroplasty (median age 61 years (range 41-84); median duration since operation 4 years (range 2-8 years)); group 2, 14 patients with highly selective vagotomy (median age 44 years (range 27-69); median duration since operation 5 years (range 1-8 years)). None of the patients had symptoms suggestive of dumping, intolerance to milk, or malabsorption. None of the patients was taking antacids, H₂ receptor blocking agents, anticonvulsants, calcium, or vitamin D replacement.

A fasting venous blood sample was collected from each patient. Blood was allowed to clot and then centrifuged immediately at 4°C; serum was stored at -20°C for estimation of parathyroid hormone and vitamin D concentrations. Plasma calcium, phosphate, albumin, and alkaline phosphatase values were measured using an SMAC Technicon autoanalyser (Basingstoke). Serum vitamin D was measured as described,⁴ while parathyroid hormone was measured by a radioimmunoassay directed at the mid-region of the hormone (Immuno-Nuclear Corporation, USA). Statistical analysis was carried out by the two tailed Mann-Whitney U test for non-parametric data. Results are expressed as medians and ranges.

Patient characteristics and values of plasma variables assessed in truncal vagotomy (group 1) and highly selective vagotomy (group 2) patients and controls. Values are medians (ranges in parentheses)

	Group 1	Group 2	Controls
No of subjects	8	14	24
Age (years)	61 (41-84)	44 (27-69)	36 (24-60)
Years since surgery	4 (2-8)	5 (1-8)	
Calcium (mmol/l)	2.40 (2.36-2.51)	2.45 (2.35-2.56)	2.40 (2.20-2.60)
Phosphate (mmol/l)	0.97 (0.86-1.41)	1.02 (0.67-1.46)	0.98 (0.70-1.25)
Alkaline phosphatase (IU/l)	99 (57-127)	70 (49-142)	85 (35-130)
Vitamin D (nmol/l)†	5.6* (5.0-18.1)	16.2* (5.0-43.8)	38.0 (12.7-59.5)
Parathyroid hormone (pmol/l)‡	52 (34-68)	53 (25-82)	54 (23-85)

*Compared with controls: p < 0.001.

†Compared with group 2: p < 0.05.

‡Lower limit for serum concentrations of vitamin D 15 nmol/l (6.0 ng/ml). Normal range for parathyroid hormone 20-85 pmol/l (2.0-8.5 pg/ml).

Conversion: SI to traditional units—Calcium: 1 mmol/l ≈ 4.0 mg/100 ml. Phosphate: 1 mmol/l ≈ 3.0 mg/100 ml. Vitamin D: 1 nmol/l ≈ 0.4 ng/ml. Parathyroid hormone: 1 pmol/l ≈ 0.1 pg/ml.

Plasma calcium and phosphate concentrations and alkaline phosphatase activity in both groups of operated patients were similar to those in controls. Serum vitamin D concentrations in both groups of patients were significantly lower than in controls (see table), those in patients with truncal vagotomy being lower than in patients with highly selective vagotomy. Six out of eight patients with truncal vagotomy had subnormal vitamin D concentrations, while six out of 14 patients with highly selective vagotomy had subnormal vitamin D concentrations. Parathyroid hormone concentrations in patients and controls were almost identical (see table). There was no relation between serum vitamin D and parathyroid hormone concentrations and time since operation.

Comment

Our data show clearly that a large proportion of patients treated by vagotomy for duodenal ulceration develop biochemical evidence of vitamin D deficiency within eight years. Concentrations of vitamin D in the serum of our patients were comparable to those found in Asian immigrants in Britain who often have florid osteomalacia.⁴ Furthermore, patients who had a truncal vagotomy had significantly lower concentrations of vitamin D when compared with the group who had a highly selective vagotomy, suggesting that the extent of vitamin D

deficiency may be related to the degree of vagal inhibition. The absence of secondary hyperparathyroidism in our patients may reflect either a marginal deficit of vitamin D or a relatively short duration of this deficit. This contrasts with our observation of frequent secondary hyperparathyroidism in asymptomatic Asian vegetarian subjects.⁴

The mechanism of vitamin D deficiency after vagotomy is not clear. While vagotomy may alter intestinal motility, none of these patients had symptoms of dumping or malabsorption. A decrease in vitamin D intake due to an altered diet has been suggested in patients after vagotomy. Bile acid excretion may be increased after vagotomy; this may interrupt the enterohepatic circulation of vitamin D metabolites and may, over a prolonged period, lead to vitamin D deficiency. Exocrine pancreatic function also changes after vagotomy;⁵ this too may contribute to vitamin D malabsorption.

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Cryoanalgesia to relieve pain in diastasis of the symphysis pubis during pregnancy

Diastasis of the symphysis pubis is not common, occurring in about one in 20 000 births,¹ but relief of the pain during the final trimester of pregnancy is a difficult problem. The diastasis resolves completely after delivery, and so this problem of analgesia is of limited duration.¹ The pain increases with increasing size of the uterus and as it is aggravated by movement some relief can be achieved by bed rest. In the last third of pregnancy this usually results in admission to hospital because it is almost impossible for most mothers to have complete bed rest at home. There remains the problem of analgesia when movement is necessary, such as during washing and when using the commode. Non-narcotic analgesics rarely provide adequate analgesia, and most doctors are reluctant to prescribe narcotics for three months because of possible side effects.

We describe two patients with diastasis of the symphysis pubis in whom considerable pain relief was achieved by cryoanalgesia² through the caudal hiatus during the last third of pregnancy.

Case reports

During their first pregnancy both patients developed diastasis of the symphysis pubis. In their second pregnancy they complained of pain in the region of their symphysis pubis during the second trimester; diastasis was confirmed radiologically.

Case 1—A 30 year old woman was admitted to hospital in the 20th week of her pregnancy because of pain. As the uterus increased in size the pain worsened, particularly on movement. By the 30th week she was confined to bed. The worst pain was in and around her vagina rather than over her symphysis pubis. A caudal injection of 5 ml 0.5% bupivacaine plain resulted in complete relief of pain and enabled her to walk comfortably for six hours. Cryoanalgesia by the standard technique³ resulted in adequate analgesia until delivery six weeks later.