

Lesson of the Week

Enteral feeds may antagonise warfarin

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It is well known that a wide range of drugs can antagonise oral anticoagulants. Nevertheless, despite several reports from the United States¹⁻³ and Australia⁴ it is not widely realised in Britain that enteral feeds may have an unexpectedly high content of vitamin K, which may cause apparent resistance to oral anticoagulants. We have recently seen such a case.

Case report

A 49 year old white man had undergone a resection of the small bowel after a thrombosis in the mesenteric vein. He had a long past history of both superficial and deep venous thrombosis with pulmonary emboli. He had a family history of repeated venous thrombosis, but investigation showed no deficiency of antithrombin III. He was therefore being anticoagulated with warfarin at a stable maintenance dose of 8 mg daily to maintain his prothrombin ratio within the range 2.0-3.3. Two months after starting warfarin he was given supplemental enteral nutrition because of increasing intolerance of normal food with symptoms of subacute small bowel obstruction. After starting Isocal 3550 ml daily his symptoms settled, but it proved necessary to increase the maintenance dose of warfarin to 13 mg over five days to maintain adequate anticoagulation. After six weeks of enteral feeding a further limited small bowel resection was performed. Subsequently he was able to return to a normal diet and Isocal was stopped. His daily warfarin requirement slowly fell to the original maintenance dose of 8 mg. When last seen he was in good health.

Comment

Fluctuations in the dietary intake of vitamin K can cause substantial alterations to the warfarin requirements of patients taking oral anticoagulants.^{5, 7} Hence it has been suggested that patients receiving warfarin should avoid vegetable rich diets on account of their high vitamin K content.⁸ Our patient's prothrombin ratio had remained satisfactory while receiving a constant dose of warfarin and taking a normal diet. As soon as the Isocal was started the warfarin dosage had to be increased for satisfactory control, despite the resolution of his symptoms of subacute bowel obstruction and no other changes in treatment. On discontinuing the Isocal the warfarin dosage could be lowered to its original level, again with no other changes in drug treatment. Thus it seems highly probable that the warfarin resistance was due to the Isocal. While another possible factor might have been a transient alteration of liver function, this

Failure to appreciate the high vitamin K content of some enteral feeding preparations may have serious consequences in patients taking oral anticoagulants

remained normal throughout the entire period. Isocal contains 130 µg vitamin K per l, so that our patient's intake from this source was 460 µg daily. Several other commercially available enteral feeds contain at least as much vitamin K as does Isocal (table). By contrast, the average vitamin K content of a normal hospital diet is 300 µg/day.²

Vitamin K content of some enteral feed preparations

Preparation	Manufacturer	Vitamin K content
Clinifeed range	Roussel	Nil
Complan	Farley Health Products	250 µg/100 g
Ensure	Abbott	100 µg/100 ml
Ensure Plus	Abbott	21.3 µg/100 ml
Flexical	Mead Johnson	250 µg/454 g
Forceval Protein	Unigreg	Nil
Fortison range	Cow and Gate	Nil
Isocal	Mead Johnson	13 µg/100 ml
Nutranel	Roussel	200 µg/100 g
Nutrauxil	KabiVitrum	10 µg/100 ml
Triosorbton	Merck	250 µg/100 g
Vivonex (standard)	Norwich Eaton	11.17 µg/80 g
Vivonex HN (high nitrogen)	Norwich Eaton	6.7 µg/80 g

We think that this case and those previously reported¹⁻⁴ justify close monitoring of the prothrombin ratio whenever enteral feeding preparations are started or discontinued in patients receiving oral anticoagulants. Particular risks may arise when patients revert to normal diet after enteral feeding, as dangerous overanticoagulation may develop insidiously.

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