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Wireless capsule endoscopic finding in Cronkhite-Canada syndrome

As a new exciting non-invasive diagnostic technology, wireless capsule endoscopy (WCE) has demonstrated its power in examining the small bowel. There is growing acceptance globally not only in the investigation of obscure gastrointestinal bleeding, but in several uncommon diseases such as Behcet's disease,¹ Whipple's disease,² even hereditary polyposis syndromes, and so on. In 2005, several articles in *Gut* discussed its increasing role in the diagnosis of Crohn's disease.^{3–5}

Cronkhite-Canada syndrome (CCS) is a rare non-hereditary gastrointestinal polyposis

with ectodermal changes, first reported in 1955. Intestinal polyposis is one of the common features but there are few published studies showing the direct view in vivo, which has been confirmed mainly by radiological studies previously, partly because of the limitations of the technique. Hence WCE was performed to learn more about the small bowel mucosa in CCS.

A 72 year old Chinese man was admitted with a three month history of fatigue, anorexia, hypoguesia, cutaneous hyperpigmentation, onychodystrophy, as well as oedema of the lower limbs. There was no significant family history. Biological tests showed anaemia, obvious hypoalbuminaemia, and reduced serum Ca (1.71; normal 2.15–2.55 mmol/l), Zn (10.57; normal 12.68–18.56 µmol/l), and Cu (7.81; normal 10.22–25.18 µmol/l) while serum gastrin and CEA were negative. Except for those in the duodenum, which were purplish in colour, numerous reddish, sessile, and oedematous polypoid structures from the stomach to the rectum with friable and haematose mucosa were found on endoscopy. Endoscopy revealed hyperplastic polyps of the antrum and adenomatous proliferous polyps of the colon histopathologically, while the oesophagus was normal, which was concordant with the radiological investigations. Protein losing enteropathy was also confirmed by ^{99m}Tc-HSA. A diagnosis of CCS was established after other relevant examinations.

A barium enema and small bowel series were performed to look for cancerous changes and to evaluate risk, although this was based on only anecdotal evidence (4th ICCE 2005). Forlax (Beaufour-Ipsen, France) and subsequent Senna (a type of mild Chinese herbal medicine) were taken as purgatives together with enough liquid and electrolytes. Espumisan ((CH₃)₃Si[-O-Si(CH₃)₂]nCH₃+SiO₂; Berlin-Chemie AG, Menarini, Germany) was taken before examination after six hours of fasting. PillCam SB capsule endoscope (Given Imaging Ltd, Israel) was grasped by a polypectomy snare and transferred endoscopically into the duodenum to prevent the gastric polypi retarding the capsule. Our patient remained on his right side for two hours after ingestion to allow a longer examination time of the small bowel. WCE showed a strange pattern of disease involvement along most of the small bowel mucosa: the mucosa was actinia-like with multiple herpes-like polyps studded in the jejunum, but it was strawberry-like with

reddish polyps studded separately in the distal ileum (fig 1).

Some data support the fact that CCS may be a late onset disease,⁷ and perhaps some patients are asymptomatic, such that the condition is not as rare as once thought. Furthermore, Samaha and Arber recently noted that juvenile polyposis and/or Peutz-Jegher syndrome could be a form of CCS, or vice versa.⁸ Thus more sensitive, safe, and simple methods must be found to scan those patients that perhaps have been missed previously. WCE is a potential candidate. It is also possible that there is mucosal polymorphism, as our findings were different to those of Coumaros (the "arborescent villousities" reaching the whole small bowel; 4th ICCE). More studies are necessary. It would be helpful if there were a registry database to allow sharing of information from all physicians which would help correct the problem in studying such a rare disease.

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Figure 1 Wireless capsule endoscopy of the small bowel mucosa.

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Immunonutrition enhances the expression and secretion of mouse intestinal defensins

The nutrient rich lumen of the small intestine provides a favourable environment for microbial cell growth. Secretion of defensins from Paneth cells constitutes a key source of antimicrobial peptide activity in the crypt lumen.¹ In addition, defensins also recruit the adaptive immune system.^{2,3} Chronic disease, major surgery, trauma, or malnutrition results in immune compromise and can

increase the risk of infection and sepsis.⁴ Several clinical studies have demonstrated that patients fed an immune enhancing formula had significantly fewer infectious complications, needed less antibiotics, and had a shorter hospital stay than patients fed standard diets.⁵ However, the mechanism by which these formulas bolster the immune system is unclear.

We hypothesised that a nutrient enriched diet bolsters the immune system by upregulating defensin expression in the jejunum and ileum, the two parts where cryptidins (mouse intestinal defensins) are highly expressed. To study the effect of an immune enhancing diet (Perative; Ross Products, Abbott Laboratories, USA) on intestinal defensin expression, we used mice fed either regular chow or Perative for a week. The volume of Perative (complete balanced nutrition containing partially hydrolysed peptide based high protein (sodium caseinate, lactalbumin, 66.7 g/l), arginine at 2.5% of total calories, dietary nucleotides, canola oil,

Figure 1 Expression levels of cryptidins 1–3 and cryptidin 4 after Perative supplementation. (A) Levels of cryptidins 1–3 in the jejunum and ileum of chow fed versus Perative fed mice. (B) Levels of cryptidin 4 in the jejunum and ileum of chow fed versus Perative fed mice. (C) Levels of cryptidins 1–3 and cryptidin 4 in primary Paneth cells treated with isoleucine (Ile), arginine (Arg), and Perative. In (A) and (B), total RNA was extracted and cryptidin levels analysed by Northern blot analysis and normalised to β -actin. In (C), cells were treated for six hours, total RNA was extracted, and cryptidin levels were analysed by quantitative real time polymerase chain reaction and normalised to *Gapdh*. Each bar represents the mean (SEM) of three independent experiments. CM, complete medium. ** $p < 0.005$ significantly different from control (Student's *t* test).