Gastrointestinal Bleeding in Distance Runners

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Athletes often have haemoglobin concentrations at the lower limit of normal. This 'sports anaemia' does not appear to limit performance and indeed some investigators consider it a beneficial adaptation which increases oxygen delivery to the muscles by reducing blood viscosity. There is no agreement as to its cause, but the most popular theory is that of haemodilution. However, some athletes, distance runners in particular, may develop a more profound and performance-limiting anaemia. Many will be found to be iron deficient (Dufaux et al. 1981). Iron deficiency in the well-nourished adult is rarely because of nutrition, but I suspect that some thin, anaemic, weight-conscious runners do have dietary-induced iron deficiency. The 'heme' iron of red meat is the most readily available form of dietary iron, but one need not be a vegetarian marathoner to have marginal iron intake. Even joggers have been reported to eat less red meat, bacon and sausages than inactive controls (Hartung et al. 1980).

An adult eating a balanced diet does not develop iron deficiency unless there is excessive iron loss. The commonest source of iron loss in women is the menses. Although there has been a great deal of interest in the amenorrhoea which some female distance runners experience, the vast majority of female runners continue to have normal menstrual periods and, like their sedentary sisters, may have borderline iron reserves.

Iron may be lost in the urine as intact red blood cells, free haemoglobin, or as myoglobin. The latter is a consequence of rhabdomyolysis – massive muscle breakdown. Haemoglobinuria results from traumatic intravascular haemolysis in the capillaries of the feet. Exercise may also cause haematuria. It is believed that the red cells are lost through the renal glomeruli, but the mechanism is unclear. Bladder contusion may also cause haematuria (Blacklock 1977). This is of some importance when we consider the proposed mechanisms for gastrointestinal blood loss in runners.

1. Iron Deficiency and Gastrointestinal Bleeding

In adult males iron deficiency is usually the result of gastrointestinal bleeding. Surprisingly, this possibility has only recently been considered in runners. A history of overt or visible blood loss is unusual, but when it occurs it may be dramatic – witness Derek Clayton's description of 'vomiting black mucus' and having 'black diarrhoea' after his world's best marathon performance in Rotterdam in 1969. There have been several reports of unexplained bloody diarrhoea in distance runners (Cantwell 1981; Fogoros 1980; Sharman 1982; Volpicelli 1983) and recently 3 cases of haematemesis have been reported (Papaoanndides et al. 1984). One of these patients was found to have haemorrhagic gastritis. A single jogging death has been attributed to haemorrhagic gastritis (Thompson et al. 1982). Keeffe et al. (1984) in a recent survey of marathoners found that 2.4% of those who answered
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their questionnaire 'occasionally or frequently' had bloody stools. More commonly, however, runners are not aware of gastrointestinal bleeding and the blood loss is occult.

2. Detection

The incidence of occult gastrointestinal bleeding depends on the method used for its detection. If one uses a relatively insensitive method such as the Hemoccult II guaiac cards (SmithKline Diagnostics) anywhere from 8% to 23% of distance runners will have stools positive for occult blood after a marathon (McCabe et al. 1984; McMahon et al. 1984; Porter 1983; Volpicelli 1983). The Hemoccult II slide test is a qualitative method of detecting faecal blood loss. It is better at detecting bleeding from the colon than from the upper gastrointestinal system, but even in the colon up to 20ml of blood may need to be lost per day for the test to become positive (Simon 1985). If one uses the more sensitive quantitative HemoQuant assay (which is not commercially available) as was done by Stewart et al. (1984) then it can be shown that nearly all runners will have increases in faecal blood loss after a long distance race and that a third will have blood losses above the accepted upper limit of normal.

3. Causes

Why should runners bleed from their guts? Many use non-steroidal anti-inflammatories for their aches and pains, but these do not appear to be a major factor. It seems that the bleeding is in some way related to the runner's level of fitness, intensity of training and degree of exertion. There are 2 major theories. The first proposes that the bleeding is due to gastrointestinal ischaemia. During exercise splanchnic blood flow may decrease by up to 80% (Clausen 1977). Normally, the gut is tolerant of this decreased perfusion, but runners, like mad dogs and Englishmen, may go out in the midday sun and one can imagine situations where excessive fluid loss and hypovolaemia compound the effects of physiological splanchnic hypoperfusion.

The other theory proposes that gastrointestinal bleeding results from trauma or contusion to the lower gastrointestinal tract as a result of repeated jarring of the colon. This seems most likely to occur in the caecum and has been called the 'caecal slap syndrome' (Porter 1982). A similar mechanism might cause bladder contusion and haematuria (Blacklock 1977).

If a runner does bleed from his gut, how can the mechanism be sorted out? I think there are several useful courses of action. The runner who vomits blood should, like any other person with an upper gastrointestinal bleed, be endoscoped. The 'dry heaves' may have caused a Mallory-Weiss tear. Non-steroidal anti-inflammatories may cause gastric erosions. Stress or ischaemia may cause haemorrhagic gastritis. The runner may have a coincidental peptic ulcer. If the problem is lower gastrointestinal bleeding, haemorrhoids can be quickly excluded by proctoscopy. If one is looking for either ischaemic or traumatic injury to the colon then colonoscopy is the investigation of choice. Haemorrhagic lesions at the splenic flexure suggest ischaemia and this could be supported by mucosal biopsies. If trauma is the problem, one might find lesions in the caecum or possibly the sigmoid as it passes over the brim of the pelvis. Support for a traumatic aetiology might also come from the urologist if he cystoscopes the runner with haematuria and finds bladder contusion. All of these endoscopic procedures should be performed as soon as possible after the onset of bleeding since the lesions we are looking for may be evanescent.

4. Conclusions

As mentioned, overt blood loss from the gastrointestinal tract is unusual; the problem is more often occult. One cannot go endoscoping or colonoscoping asymptomatic runners who have some occult gastrointestinal bleeding following a marathon. Perhaps experimentally one could try to relate blood loss to colonic jarring by videotape and computer analysis of running style or by assessing vertical motion via an accelerometer. Fluid loss and hypovolaemic factors can be assessed by measur-