Intramural stratification with deposition of fat in the submucosal layer of the bowel wall, visualised on computed tomographic (CT) scans of the abdomen, is known as the fat halo sign.1 Owing to infiltration of the submucosa by fat, the inner layer mucosa are separated from the outer layer of muscularis propria/serosa (both being of soft tissue density) by a layer of fat (of low attenuation) measuring between -18 to -64 Hounsfield units.1-3

Historically, the fat halo sign has been associated with patients suffering from chronic inflammatory bowel disease.1-3 Less commonly, it has also been associated with cytoreductive therapy, graft-v.-host disease and renal calculi.1-3 When seen in both the small and large bowel, the fat halo sign has been considered pathognomonic of Crohn's disease.1,2

Harisinghani et al. conducted a study in 2003 evaluating the presence and frequency of the fat halo sign in patients undergoing abdominal CT for clinical indications unrelated to the gastrointestinal tract.1 They concluded that 21% of the study population were positive for the fat halo sign, of whom 6 (28%) had renal stone disease and 15 (72%) did not have renal stone disease.1 The intestinal distribution of the fat halo sign in these patients was the terminal ileum (4%), ascending colon (28%), transverse colon (34%), descending colon (36%), sigmoid colon (14%) and rectum (10%).1 None of the patients in whom the fat halo sign was demonstrated had previous or current gastro-intestinal symptoms suggestive of inflammatory bowel disease or a history of gastro-intestinal disease.1,3 This argues the fat halo sign as being a normal variant seen in a certain portion of the population.1,2 A statistical relationship between the fat halo sign and obesity has also been established.1

Fig. 1a. Axial post contrast CT abdomen at the level of the rectum demonstrating the fat halo sign, i.e. the central fatty submucosal layer of low attenuation surrounded by higher attenuation inner and outer layers grossly corresponding to the mucosa and muscularis propria/serosa of the rectum respectively.

Fig. 1b. Coronal post contrast CT abdomen of the same patient with oral contrast demonstrates a low-attenuation fat layer in the wall of the caecum, ascending colon and terminal ileum. The patient did not have clinical or radiological features of inflammatory bowel disease, and the fat halo sign was a normal variant.

Fig. 1c. Axial post contrast CT abdomen of the same patient with oral contrast demonstrates a low-attenuation fat layer in the wall of the caecum and terminal ileum.
Pitfalls associated with interpretation of the fat halo sign specifically involve intestinal distension. The sign has a tendency to disappear or become less apparent when the bowel lumen is more distended. It is thought that distension of the bowel lumen causes obscuring of the thin fat layer. Therefore, the fat halo sign is best appreciated when the lumen is partially collapsed. Other factors advocating a positive fat halo sign are prone position of the patient, and not using a contrast agent. The constellation of 4 signs that strongly suggests the fat halo sign representing a normal variant, as opposed to inflammatory bowel disease, includes increased prevalence in the collapsed state, decreased prevalence with distension of the bowel lumen either by gravity or gas, disappearance of the fat halo sign with additional distension, and a thin calibre of the fatty layer. The presence of a normal haustral pattern also supports the sign being a normal variant. More commonly, a normal intramural fat layer is seen in the terminal ileum and descending colon. It is generally much thinner than the fat layer seen in inflammatory bowel diseases.

In conclusion: the presence of the fat halo sign may in the absence of clinical and radiological features of inflammatory bowel disease represent a normal finding that may also be related to obesity.


The hyperdense MCA sign and the MCA dot sign

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The hyperdense middle cerebral artery sign (HMCA), first described in 1983, refers to the hyperattenuation of the middle cerebral artery (MCA) M1 segment on non-enhanced computed tomography (CT). The sign is due to a thromboembolus of the M1 segment of the MCA. Because the sign is a marker of vascular occlusion rather than a direct image of the resulting parenchymal changes, the HMCA sign can be considered an indirect indicator of subsequent infarction and is one of the earliest signs of ischaemic stroke.

The MCA dot sign is a punctate focus of hyperattenuation located in the sylvian fissure on non-enhanced CT, and is a recently described variant of the HMCA sign. The sign represents a thromboembolus within a segmental branch of the MCA, M2 or M3 segment, located within the sylvian fissure. As the M2 and M3 segmental vessels tend not to course in the transverse plane of imaging, the occluded vessel is seen in cross section, appearing as a hyperattenuating dot within the sylvian fissure.

While the HMCA sign and MCA dot sign are similar in that they both depict thromboembolus at different levels of the MCA, there are important clinical and prognostic distinctions. The HMCA sign suggests that a major cerebral vessel is occluded, suggesting a larger territory at risk for hypoperfusion compared with the more distal vessel occlusion of the MCA dot sign. Therefore, the MCA dot sign in the absence of the HMCA sign is associated with improved short-term clinical outcome.

These signs have a high specificity of almost 100% with a high positive predictive value but a low sensitivity of approximately 38 - 40% for thromboembolic occlusion of the MCA.

Mimics of the HMCA sign, the pseudo hyperdense MCA sign, include vascular calcification, raised haematocrit, intravenous contrast and partial volume averaging. Another important cause of a pseudo