tubercular chemotherapy, but the duration of follow up and details of recurrence of obstruction are not given.

Ileoceleal tuberculosis should be described as a separate entity from colonic tuberculosis. Anti-tubercular chemotherapy may be used as the primary treatment if a definite histological diagnosis of tuberculosis has been obtained, if there is no suspicion of malignancy, and if there is no intestinal obstruction; in all other cases surgical treatment should be offered.

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Reply

EDITOR,—I thank Dr Kapoor for his comments on our recent publication in which he raises several issues:

1—He contends that ileoceleal tuberculosis should be considered a distinct entity, separate from large or small bowel tuberculosis. He does not, however, provide a rationale for this suggestion. In our report we included caecal lesions (with or without ileal involvement) as colonic lesions because the caecum is anatomically regarded a part of the colon and because the treatment and the response to treatment is the same whether or not the ileum is involved.

2—Caseating granulomas with acid fast bacilli are a histological hallmark of tuberculosis and we agree that in their absence distinction from Crohn's disease can be difficult. In fact, the difficulty in distinguishing Crohn's disease of the colon from tuberculosis of the colon has been repeatedly emphasised in our paper. The granulomas of tuberculosis, however, in contrast to Crohn's disease, tend to be confluent, have a heterogenous appearance, are composed of larger numbers of multinucleated giant cells, and are invariably surrounded by inflammatory cells. As with any disease, a diagnosis must be made based on the history, physical findings, and the results of all the investigations interpreted in the context of the overall clinical situation.

3—Colonic malignancy was considered in 96% of our patients, but this was based exclusively on the colonoscopic appearances. When this was taken together with the rest of the clinical picture and the histology, which showed features suggestive of tuberculosis and no indication whatever of malignancy, we felt justified in initiating treatment for tuberculosis rather than subjecting the patient to a diagnostic laparotomy. While colonic tuberculosis and malignancy of the colon are known to occur in the same patient, this is relatively uncommon, although this possibility should be borne in mind.

4—Patients with intestinal strictures and symptoms of subacute intestinal obstruction have usually been known to respond to anti-tubercular treatment without requiring surgery as part of their treatment. In general, the response to chemotherapy, as assessed by a diminution in the intensity of the symptoms and an increased sense of wellbeing, is dramatic. We maintain that a trial with antituberculous drugs is indicated in all patients with intestinal tuberculosis except those with complications such as perforation or fistula formation.

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New theories based on inappropriate application of high technology

EDITOR,—The article by Howard et al (Gut 1991; 32: 1406-11), brought to my attention, has a puzzling conclusion drawn by the authors. Based upon their ultrasound findings, Howard et al proposed a new theory that the emptying of the gall bladder after a meal is in three phases. I have read this article with great interest and find that this new theory may have resulted from an inappropriate use of ultrasound for measuring gall bladder emptying.

The measurement of gall bladder volume by a geometric method, called the sum of the cylinder method, was originally described in 1948 by de Silva. The method requires that the gall bladder be a pear shaped organ that can be cut into a series of small cylinders and stacked one above the other. The volume is then computed by summing up the volume of each cylinder. Everson et al, using ultrasound, modified de Silva's method slightly by applying the correction factor to account for the change in curvature of the gall bladder. To be accurate, this method again requires that the gall bladder be pear shaped and change in the displacement of the longitudinal axis be uniform. Everson et al, however, cautioned that the shift in the longitudinal axis may not be uniform in all and that the volume would be an overestimate in the case of long narrow tapering segments at each end of the gall bladder. Also, in situations where the long axis is parallel to but displaced from the central axis, the gall bladder volume will be underestimated in the tapering regions.

The gall bladder at rest has many shapes, often with segmentations and septa. The gall bladder changes its axis and shape during its contraction.* The mean resting pressure inside the sphincter of odd is 15 cm of water, the through the bile duct 12 cm of water, and the gall bladder 10 cm of water. If the tensed gall bladder does not generate enough pressure inside to overcome sphincter of odd pressure, it may not empty bile despite appearing small in size. To overcome these disadvantages, we have introduced a count based non-geometric scintigraphic method where the bile emptying measurement is not influenced by the change in shape or the axis of the gall bladder. The bile emptying is measured as ejection fraction. Measurement of the absolute bile volume is not required.*

The main portion of the normal gall bladder filling occurs from the absorption of water through the wall and not from frequent emptying and refilling. We studied over 500 normal subjects with technetium-99m HIDA compounds by acquiring the data at a half or one minute interval for 60-120 minutes. A typical gall bladder filling phase is a smooth uping curve without any serrations (no emptying or refilling). On rare occasions, a gall bladder may empty spontaneously before the meal. This spontaneous emptying is rare and when it occurs it accounts for less than 5-10% ejection fraction in normal subjects. When the fatty meal is ingested, the gall bladder shows a latent period of 6-16 minutes before it begins to empty bile which is consistent with the known normal release time of endogenous cholecystokinin into circulation. In more than 50 normal subjects, which we studied with a fatty meal, an early dip of the cephalic phase was seen in less than 5%. When the normal gall bladder responds to emptying following endogenous cholecystokinin release, it maintains its continuous emptying for 60-120 minutes without

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Figure 1: Typical normal gall bladder bile emptying curve following fatty meal. Note a latent period of 16 minutes before bile emptying begins. Once the bile emptying begins it is continuous and sustained with no refilling during the ejection period. (Reproduced with permission from J Nucl Med (Ref 5).)