

LETTERS TO THE EDITOR

Ultrarapid urease test

EDITOR,—We read the description of the urease test published in *Gut* 1991; 32: 467–9) and tried to reproduce the test, but without success. The test, as described in the article, used 0.5 ml of a 10% urea solution, adjusted to pH 6.8; it was stated that upon the addition of one to two drops of 1% phenol red solution, a colour change from yellow to pink should occur within the first minute, if urea splitting bacteria are present. A 10% urea solution has a pH of 7.5 and therefore has to be adjusted. Phenol red is poorly soluble in water so that a 1% aqueous solution cannot be obtained. The addition of one to two drops of the indicator causes urea solution to turn orange/red even before urease is added.

The method described in the article states that a 1% phenol red (free acid) solution is used. A 1% solution of sodium salt is unsuitable because it has a pH of 6.6 and causes the urea solution to turn orange, even in the absence of urease. Phenol red for gastric acid titration (Merck list No 7247) is also unsuitable as the indicator solution has a pH of 6.6 and causes urea solution to turn red again, before the addition of urease. The only indicator we found suitable for the test was based upon a 1% phenol red solution described in the *Deutsche Arzneibuch DAB* (German Pharmacopoeia) which contains 2.82% 0.1 normal sodium hydroxide, 20% ethanol (96%). The addition of one drop of this indicator turned the urea solution yellow; after addition of urease a slow colour change to red occurred.

The reported concentration of 2×10^6 bacteria to which the test is claimed to respond to within a minute is difficult to quantify. As the principle of the test is based on urease activity, the author should have specified the concentration in terms of urease units. We have performed a direct comparison of the Jatrox-Hp test (Röhm Pharma) with the 'one minute test'. A urease solution containing 0.025 urease units was used. With such a solution the Jatrox test produced the required colour change in 10 minutes, whereas the 'one minute test' took 35 minutes. The performance of both test times was quicker with higher concentrations of urease. At 0.5 urease units, the colour change in both tests occurred in 1.3 seconds. Thus, the one minute test only fulfils its name at high concentrations of urease.

The one minute test appears straightforward, as described, but in practice there are problems in setting it up and false negative results are possible with low urease concentrations. We feel that, in clinical practice, a standardised test such as a Jatrox-Hp test will give significantly more reliable results than can be expected from the rapid endoscopy room test as described in the article.

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Reply

EDITOR,—We welcome the opportunity to reply to the letter of Mann. The major advan-

tage of our ultrarapid urease test is its simplicity, cheapness, and high predictive value for *Helicobacter pylori* infection in clinical practice. Since publication of our paper, the test has been rigorously 'field tested' in a relatively remote part of the developing world and has performed well.¹

We agree that phenol red is comparatively insoluble in water; we prepare a 1% aqueous suspension which we allow to settle out after extensive stirring. We have no difficulty in obtaining our supply of the 'free acid' from the Sigma Chemical Company (Catalogue Ref P-4633). The pH of the initial urea solution is not critical if sterile, deionised water is used and the urea is of Analar grade. The exact pH of the solution will vary according to the quality of water used and particularly the degree of deionisation. What does appear to be of major importance is the pH and colour of the final test solution. The lower pH limit at which phenol red (free acid) changes colour from yellow to red is approximately pH 6.8. The ideal test solution is therefore one which, while remaining yellow in colour has a pH close to 6.8, thus ensuring maximum sensitivity.

Based on our experience, we would recommend that to optimise the test's usefulness a sterile needle is used to transfer the gastric biopsy specimen to the Eppendorf tube and that the tube should not be agitated. This makes for greater sensitivity as it is usually possible to see the first plume of red colour ascending from the biopsy specimen within a few seconds. The test inocula of approximately 2×10^6 bacteria that we used to validate the test were obtained from our Microbiology Department through the process of colony counting and serial dilution. We felt that this was a more relevant way to initially standardise the test than using urease alone. There does not appear to be any problem in clinical practice using gastric biopsy specimens which seem to contain more than enough organisms (and therefore enough urease activity) to make this ultrarapid urease test highly effective.

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1 Katelaris PK, Lowe D, Norbu P, Farthing MJG. *Gut* 1991; 5: A570.

BOOK REVIEWS

Gastrointestinal radiology. By J Farman. (Pp 200; illustrated; £59.95.)

True to its title, this annotated atlas restricts itself to imaging of the gastrointestinal tract that requires radiation, namely plain and barium radiography, and computed tomography.

The author is Professor of Radiology at the Columbia Presbyterian Medical Center, New York. He has created a 190 page glossy tome of uniformly excellent images which cover the familiar territory between the oesophagus and anus, with the biliary tract (two DISIDA scans) included. The text is minimal, and supplemented by generous case histories, simple line

drawings, and many fine images liberally adorned with red arrowheads.

Medical students and junior hospital doctors would benefit most, seeing many examples of oesophageal carcinoma, duodenal ulcers and, in what is the best section of the book, a great variety of afflictions besetting the small bowel. Despite the inclusion of a few rarities, such as metastases to the duodenal lumen or the gallbladder wall, there is little in the work that could not be gained from the average x ray film museum of a university department or teaching hospital. It is, therefore, not a serious contender for the book-money in the pocket of a gastroenterologist or radiologist.

R DICK

Nuclear medicine in gastroenterology. Edited by Hans J Biersack and Peter H Cox. (Pp 250; illustrated; £64.00.) Dordrecht: Kluwer Academic, 1991.

This 250 page publication is largely based upon contributions from English and German authors, and spans the full range of nuclear medicine techniques which are currently used in gastroenterology. It is divided into three sections, dealing with liver and bile, stomach and intestines, and miscellaneous techniques.

The liver section, in particular, gives a comprehensive detailed account of the nuclear medicine techniques for imaging liver function, including descriptions of the various quantitative techniques now available. This area will be of particular interest to nuclear medicine specialists, and gastroenterologists with a particular research interest in the hepatobiliary field. Unfortunately, as the authors correctly observe in a number of cases, the need for liver scintigraphy, particularly in the diagnosis of metastases, and in the differential diagnosis of jaundice, has been largely superceded by developments in ultrasound, although the sections on the evaluation of liver grafts and the differential diagnosis of liver tumours continue to be of special importance.

I was less impressed by the section dealing with the stomach and intestinal tract. The chapter dealing with the diagnosis of ulcers using sucralfate is overlong, in describing a technique which has largely become discredited. Conversely, the chapter dealing with the diagnosis of inflammatory bowel disease (six pages) is insufficiently comprehensive to describe one of the newest and most exciting developments in nuclear gastroenterology, and concentrates almost exclusively on the use of Indium labelled white cells, with virtually no mention of HMPAO labelling, which many departments are now using. In addition, abscess detection hardly receives any consideration. This is a serious defect in a book of this type, and will deter many potential purchasers.

In the final section there is a good account of radioimmunoscintigraphy, using labelled antibodies to diagnose and stage the presence and extent of tumours, and here the length of the chapter is more commensurate with the growing value of this particular technique.

In summary, there is much in this book that will interest the nuclear medicine specialist and gastroenterologist with a strong research interest in nuclear medicine. The general clinician, with an interest in gastroenterology, may be less impressed. It is unfortunate that the readability of a number of the German contributions is less than optimal. Sentences such as 'Is the tumour delineated without doubt, one has to reflect on the question, is this