

- 7 Summers RW, Anuras S, Green J. Jejunal manometry patterns in health, partial intestinal obstruction and pseudo-obstruction. *Gastroenterology* 1983; **85**: 1290–300.
- 8 Anuras S, Sutherland J. Small intestinal manometry in elderly subjects. *J Am Geriatr Soc* 1984; **32**: 581.
- 9 Rees WDW, Leigh RJ, Christofides ND, Bloom SR, Turnberg LA. Interdigestive motor activity in patients with systemic sclerosis. *Gastroenterology* 1982; **83**: 575–80.

### Intestinal permeability and statistics

SIR,—We read with interest the paper by Bjarnason *et al* (*Gut* 1986; **27**: 1292–7) about the effect of non-steroidal anti-inflammatory drugs (NSAIDs) on the permeability of the human small intestine by using 51Cr-EDTA method. Their conclusions may be summarised as follows: (1) there is a stepwise increase in excretion values of 51Cr-EDTA after ingestion of NSAID according to their potential for inhibiting cyclooxygenase. (2) The effect of NSAID in intestinal permeability is systemically mediated. (3) An increased urinary excretion of 51Cr-EDTA is not related to increased glomerular filtration rate due to indomethacin. (4) Prostaglandin E<sub>2</sub> decreases the absorption of 51Cr-EDTA but does not prevent the indomethacin-induced increased intestinal permeability. The paired Student's *t* test was used to assess all variables in this study.

In our opinion the statistical analysis in this paper merits some criticism. The Student's *t* test for paired data is an appropriate test when used as it was in the above stated third conclusion. There, the authors compare two means obtained in the same individuals, and the *t* test for paired data is a good choice.<sup>1,3</sup> When more than two means are to be compared, as in conclusions 1, 2, and 4, analysis of variance is the most useful technique, because it determines whether there are differences between the means of several groups.<sup>1,3</sup> When significant differences do exist, a multiple comparison test — that is, Scheffé, Tukey, Newman-Keuls and Duncan tests — should be used to assess which are the populations which differ from the others.<sup>2,3</sup> If multiple *t* test are used for this latter purpose, the results obtained are difficult to interpret. Each time the test is applied the level of significance increases and therefore there is an increase in the probability of labelling a result as 'statistically significant', even when all populations have identical means.<sup>1,3</sup> Unfortunately this lack of accuracy in selecting the statistical methodology may mislead the reader. This is especially regrettable, as the measurement of intestinal permeability, as shown by Bjarnason *et al*, promises to be important in the understanding of the physiopathology of IBD, some systemic illnesses and of the noxious effects of certain agents such as alcohol and NSAID's on the integrity

of the gut. This technique is becoming important in clinical research and the results obtained with it have to be carefully handled in order to take best advantage of its possibilities.

M ESTEVE AND M A GASSULL

*Department of Gastroenterology,  
Hospital de Bellvitge "Prnceps d'Espanya",  
Hospitalet de Llobregat, Barcelona, Spain*

### References

- 1 Schwartz D. *Méthodes statistiques à l'usage des médecins et des biologistes*. Paris: Flammarion Médecine-Sciences, 1981.
- 2 Godfrey K. Comparing the means of several groups. *N Engl J Med* 1985; **313**: 1450–6.
- 3 Snedecor GW, Cochran WG. *Statistical methods*. Ames, Iowa; Iowa State University Press, 1980.

### Reply

SIR,—We accept the aforementioned comments. Analysis of variance, however, largely confirms the statistical statements obtained by the *t* test. The two exceptions were that the increased permeability after ibuprofen and the decreased permeability after Prostin E<sub>2</sub> were of borderline significance using analysis of variance. In the face of a significant *t*-test these results should, therefore, be viewed as probable rather than proven.

INGVAR BJARNASON, PETER WILLIAMS, PAUL SMETHURST,  
TIMOTHY J PETERS AND JONATHAN A LEVI

*Northwick Park Hospital  
and Clinical Research Centre,  
Harrow,  
Middx. HA1 3UJ.*

### Reply\*

#### Endoscopic sclerotherapy using absolute alcohol

SIR,—Thank you for giving us the opportunity to reply to the letter of Bhargava *et al*. *Gut* 1986; **27**: 1518. In their experience, sclerotherapy with absolute alcohol resulted in a high complication rate. Whilst respecting their technical skill, a number of minor details need attention to better assess their results. The use of Olympus NM 1 K or 3 K injector is not ideal for intravariceal sclerotherapy. The frequency of inadvertent paravariceal or intramural injection of the sclerosant could be quite high. We therefore, recommend the use of a transparent Teflon injector, through which blood can be seen to flow up into the tube on puncturing the varix<sup>1,2</sup> ensuring an intravariceal injection. We feel also that the optimal amount of the sclerosant to be used per puncture must be determined. In our experience, 'blanching' is a useful indicator when to stop while injecting alcohol<sup>1,5</sup> or ethanolamine oleate. If larger amounts of sclerosant are injected, complications would