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Viruses of Vomiting

SIR,—We have read with much interest your leading article (25 November, p. 442) in which you indicate that a virus of the picornavirus or parvovirus type may be responsible for the syndrome known as "winter vomiting disease." While we would agree with you that in many cases of diarrhoea and vomiting in children, whether they be sporadic or in outbreaks, pathogenic bacteria are frequently not isolated, we feel that a distinction should be made between infantile gastroenteritis and the disease in older children. Your suggestion that the virus associated with winter vomiting disease might be responsible for gastroenteritis in children may well be true, but we feel that there are important clinical differences between the conditions infantile gastroenteritis and winter vomiting disease. In the latter vomiting is the predominant feature, the onset is abrupt, it has a high infectivity rate, spreading through families and schools with great rapidity, and it is no respecter of age. In infantile gastroenteritis, although vomiting does occur, diarrhoea is the predominant feature and is frequently very severe. The onset is variable—it may be abrupt but can also be insidious—and although infection may spread to older children and adults, in them it is generally asymptomatic, symptoms being almost exclusively confined to the very young. In this age group it may spread with alarming rapidity in nurseries and infant wards. In such situations mortality may be high.

Enteropathogenic strains of *Escherichia coli* are recognized as important causative agents of infantile gastroenteritis, but in many clinically similar cases pathogens cannot be identified by means of the 18 or

more antisera against these strains. Recently it has been shown that there are a number of strains of *Esch. coli* which produce an enterotoxin but which are not identifiable as enteropathogenic by existing antisera. These may be responsible for some of the cases of infantile gastroenteritis of "unknown aetiology." We would agree with your view that "it is impossible to contradict the substantial number of paediatricians and bacteriologists who think that bacteria are the main causes" of gastroenteritis but, as in the case of acute respiratory infections, we are almost certainly dealing with a considerable number of aetiological agents which are responsible for a variety of clinical syndromes. Until recently virological investigations employing the somewhat traditional approach of tissue culture have been largely unrewarding. It might be, however, that with the more sophisticated techniques that you refer to in your article a combined bacteriological and virological approach to the whole problem might reveal other aetiological agents if reliable and specific tests can be made generally available.—We are, etc.,

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Coxsackie B Virus and Diabetes

SIR,—We were interested to read the letter from Dr. D. R. Hadden and others (23 December, p. 729) about their failure to confirm our suggestion^{1,2} that there may be an association between Coxsackie B virus

infection and the onset of diabetes mellitus. We are concerned, however, lest a misinterpretation should discourage the physicians who are supplying material for our current survey, and we would be glad of the opportunity to comment on Dr. Hadden's results.

Fifty-eight diabetics were investigated, of whom 30 were over the age of 40 years and 24 did not require insulin. Since our investigation drew attention to the possibility of an association between Coxsackie B4 virus infection and the onset of diabetes of the insulin-dependent "juvenile" type, the antibody titres in this group would be of particular interest. Unfortunately, the relevant data were not provided in the letter, but it would appear from an earlier account³ that 12 (35%) of 34 insulin-dependent diabetics had antibody titres of 1/100 or more to Coxsackie B4 virus compared with about 20% of 121 controls. This difference is of a similar order of magnitude to that found in our investigations and although it is not statistically significant ($\chi^2=3.56$) it is not far short of significance. Indeed, if five more diabetics had been tested and two found positive, the results would have been significant at the 5% level ($\chi^2=3.84$). It is to be hoped that these investigators will not abandon their project when they may be close to obtaining a significant answer to this important problem.

Dr. Hadden's conclusion that they had been unable to find any evidence of an association was perhaps unfortunately worded; it might have been fairer to say that they had been unable to obtain evidence either for or against it. Indeed, we would say that, as far as their results go, they suggest the presence rather than absence of an association, but only a larger series could

Serum Neutralizing Antibody Tests in Tissue Culture

Coxsackie virus type	Sera with Titres of 1/4 or Greater		Significance of χ^2 test)
	Diabetics	Controls	
B1	35/102 (34%)	54/201 (27%)	Not significant
B2	47/102 (46%)	90/201 (45%)	"
B3	56/102 (55%)	107/201 (53%)	"
B4	77/102 (75%)	120/201 (59%)	P < 0.01
B5	46/102 (45%)	73/201 (36%)	P < 0.05

give a significant answer and, in view of the difficulty of obtaining a suitable control group, we doubt whether fewer than 100 patients would suffice.

It may be of interest that in our second survey 102 acute-onset diabetics have so far been compared with 201 controls by testing for the presence of serum neutralizing antibody to Coxsackie B virus at a dilution of 1/4 and a significantly greater proportion of diabetics have been found to have antibodies to Coxsackie B4 virus than controls. The provisional results are shown in table above.

In conclusion we would like to stress that, despite our further positive findings, it is still premature to draw further conclusions about their possible clinical significance. We are, however, particularly anxious that further work on the relationship between virus infection and the aetiology of diabetes should not be impeded. Both laboratory and epidemiological investigation of this problem is proceeding rapidly in the United States and large-scale studies ought similarly to be carried out in Western Europe.—We are, etc.,

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cular block has become established. It cannot be claimed to have disproved that prior treatment with alkali might have prevented the crisis.

In recent years the pragmatic advice of the past has become understood on a theoretical basis. "Isotonic" glucose causes haemodilution and thereby lowers the haematocrit. It is also physiologically hypotonic, and because of the Donnan equilibrium will cause red cells to sphere and thereby lower their intracellular haemoglobin concentration. Acidosis lowers the oxygen affinity—that is, favours sickling—and the higher the pH (well within the normal range) the more does the alkaline Bohr effect raise the affinity of the haemoglobin for oxygen. Thus there is every reason why 5% glucose and alkalization should counteract the sickling of red cells, though one would not expect that they would necessarily reverse the precipitation of deoxyhaemoglobin S in an established infarct. A failure to obtain a reversal does not permit the conclusion that these measures are useless in prevention. They are hardly so complex that they can be classed with urea treatment and exchange transfusion as unnecessary in a plea for simplicity.—I am, etc.,

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Rh Immunization in Ruptured Tubal Pregnancy

SIR,—We were interested to read the letter of Dr. R. D. Barr (4 November, p. 295), who queried the data in our paper (16 September, p. 667), and this has prompted a formal reply. We think the criticisms fall into three categories, which we will endeavour to answer.

(1) Dr. Barr quotes work done on sickle-cell disease and other haemoglobinopathies in West Africa, stating the high incidence recorded. We are aware of these findings but wish to point out that a very different state of affairs exists among South African Negroes. In our haemoglobinopathy unit no patient with an abnormal haemoglobin has been found in the indigenous populations, and haemoglobin surveys carried out in Cape Town¹ and many parts of South Africa² have shown that polymorphic haemoglobin variants are extremely rare. Thus we do not see high Hb F values resulting from these diseases.

(2) Dr. Barr queries the apparent excessive number of fetal cells found in the intraperitoneal cavity (44 per 150,000 maternal cells) and the maternal circulation (14 per 150,000 maternal cells) after a tubal rupture. As we did not quantitate the amount of maternal blood in the peritoneal cavity we have no way of knowing the total amount of fetal blood present. However, in the maternal circulation the maximum number of fetal cells was 14 per 150,000 maternal cells. When intraperitoneal tubal rupture

occurs the total blood volume of the fetus will be present in the maternal peritoneal cavity and the blood will be absorbed until such time as laparotomy is performed and the intraperitoneal blood removed. Recently Van Iddekinge,³ in a review of ectopic pregnancies in the South African Negro, reported that 30% have a greater than eight-week gestation period. In our study we have found that a significant fetomaternal haemorrhage (five or more fetal cells per 150,000 maternal cells in the mother's circulation) occurs in 24% of ruptured tubal pregnancies, and we believe that the higher fetal cell scores resulted from the rupture of a greater than eight-week tubal pregnancy. An 8-10-week fetus⁴ has an erythrocyte count of $0.3-0.5 \times 10^6/\text{mm}^3$. In order to score 14 fetal cells per 150,000 maternal cells the total amount of fetal blood in the maternal circulation would be approximately 1.5-2.0 ml. A score of five fetal cells per 150,000 is equivalent to about 0.5 ml of fetal blood. Blood volume studies have not been performed on human embryos. However, an 8-10-week fetus is 3-8 cm in length, and weighs 1 g at eight weeks and 14 g at 12 weeks; therefore 0.5-1.5 ml of fetal blood that we found in eight of the 38 patients who were studied is not excessive. Previous studies^{5,6} have shown that a score of 5-10 Rh-positive erythrocytes (0.2-0.5 ml) will result in primary immunization, and this amount was found in 24% of our patients with ruptured tubal pregnancies.

It appears that Dr. Barr is unaware that the Rh antigen has been detected in a 38-day-old fetus,⁷ and therefore these cells must be considered antigenic.

(3) All the South African negro patients who were studied were Rh-positive. Rh antibody studies were therefore not performed, but this was not the point of the paper, as our intention was to demonstrate that tubal rupture results in fetomaternal haemorrhage. We are well aware of the low incidence of Rh-negativity in the South African negro,⁸ and this was another reason not to look at Rh immunization in the group we studied.

I hope that these comments will answer some of the queries raised by Dr. Barr.—We are, etc.,

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¹ Botha, M. C., and van Zyl, L. J., *South African Medical Journal*, 1966, **40**, 753.

² Jenkins, T., personal communication, 1972.

³ Van Iddekinge, B., *South African Medical Journal*, 1972, **46**, 1844.

⁴ Wintrobe, M. M., *Clinical Haematology*, 6th edn., Philadelphia, Lea and Febiger, 1967.

⁵ Zipursky, A., Pollock, J., Chown, B., and Israels, L. G., in *Birth Defects, Original Articles Series*, ed. D. Bergsma, Vol. 1, p. 84, New York, National Association, March of Dimes, 1965.

⁶ Mollison, P. L., *British Journal of Haematology*, 1968, **14**, 1.

⁷ Bergröm, H., Nilsson, L. A., and Dyttinger, L., *American Journal of Obstetrics and Gynecology*, 1967, **99**, 130.

⁸ Zoutendyk, A., Medical Doctorate Thesis, South African Institute for Medical Research, 1962.

Diet and Congenital Defects

SIR,—The most striking feature of the incidence of anencephaly in England and Wales over the period 1962-70 is the uniformly steady decline in the rate, with no significant variation on either side of the regression line of incidence on calendar year (-0.045 for anencephalic stillbirths). This is shown in the table below. The one relatively high rate is

Anaesthesia in Sickle-cell States

SIR,—The plea by Drs. K. A. Oduro and J. F. Searle (9 December, p. 596) for simplicity in anaesthesia in sickle-cell states seems over-sanguine to me. Admittedly, for the trait states one would expect no more than competent anaesthesia with adequate oxygenation, maintenance of good circulation, etc., as is required for all patients. However, among the 42 patients without haemoglobin A one death associated with sickle-cell crisis occurred. It happened to one of the 21 SC patients—the group most at risk among the sickle-cell states because of their relatively high haematocrit. Surely an anaesthetic death rate of 2.5% is not that found in non-sicklers and cannot be considered acceptable?

It is known that simple procedures—5% glucose infusion, bicarbonate treatment—counteract sickling. Three reports on alkalization are quoted, two claiming that it prevents sickle-cell crisis and one contradicting this. The latter, however, records only a failure to find acidosis in patients admitted in sickle-cell crisis—that is, after the intravas-