

$p < 0.05$, $n = 20$) but not to the carboxyhaemoglobin concentration ($r = 0.31$, NS, $n = 19$) or cigarette consumption ($r = 0.09$, NS, $n = 22$). Thus those with higher pretreatment blood nicotine concentrations chewed the gum for longer and chewed more of it.

Side effects—Only nine people (13%) reported unpleasant side effects with the gum, and in only two cases did these cause them to give it up. Side effects reported were aching of the jaw (three subjects), mouth ulcers (three), slight nausea (two), and palpitations (one). In only one case were side effects cited as a reason for starting smoking again.

Blood nicotine concentrations in subjects using the gum—The mean plasma nicotine concentrations in the eight people for whom data were complete was 82 nmol/l (13.3 ng/ml) when they were using the gum compared with 204 nmol/l (33.2 ng/ml) when they were smoking cigarettes before treatment.

Discussion

The 38% success rate in people treated with nicotine chewing-gum was more than double that obtained in similar smokers treated at the same clinic with psychological methods and is well above the range (about 15-25%) reported for other methods.⁶ This improvement is unlikely to be due simply to secular trends in the propensity to give up smoking or to changes in the social climate, since the prevalence of smoking has not changed dramatically since the first study was done. Furthermore, the positive relation between pretreatment blood nicotine concentration and quantity and duration of gum use suggests that the presence of nicotine in the gum contributed to its success. Moreover, the incidence of side effects has been reduced since earlier studies.¹

Most of these dependent smokers found the 2 mg gum satisfactory, only six needing to change to the stronger, 4 mg, gum. Besides eliminating intake of tar, carbon monoxide, and other irritant gases, use of the gum gave rise to lower blood nicotine concentrations, which averaged less than half the smoking values.

This suggests that the gum is much safer than cigarette smoking and that cautious use would be acceptable even in those with cardiovascular disease who have failed to stop smoking with other methods. Nor is addiction to the gum a serious problem: only two (3%) of our subjects were unable to give it up.

Finally, compared with other methods the gum is cost effective in terms of the therapist's time. It need take only a few minutes to prescribe the gum, instruct a smoker on how to use it, and record progress at follow-up visits. It is therefore a practical method for busy doctors.

We thank the Medical Research Council for financial support, A B Leo for supplying the nicotine gum, Brenda Bell for secretarial help, and Colin Taylor for statistical advice. Our colleagues Stephen Sutton and Robert Hallett gave helpful comments.

References

- Russell MAH, Raw M, Jarvis MJ. Clinical use of nicotine chewing-gum. *Br Med J* 1980;280:1599.
- Raw M, Russell MAH. Rapid smoking, cue exposure and support in the modification of smoking. *Behav Res Ther* (in press).
- Schmahl DP, Lichtenstein E, Harris DE. Successful treatment of habitual smokers with warm smoky air and rapid smoking. *J Consult Clin Psychol* 1972;36:105-11.
- Lichtenstein E, Harris DE, Birchler GR, Wahl JM, Schmahl DP. Comparison of rapid smoking, warm smoky air, and attention placebo in the modification of smoking behaviour. *J Consult Clin Psychol* 1973;40:92-8.
- Jarvis MJ, Russell MAH, Saloojee Y. Expired air carbon monoxide: a simple and cost-effective breath test of tobacco smoke intake. *Br Med J* (in press).
- Raw M. The treatment of cigarette dependence. In: Israel Y, et al, eds. *Research advances in alcohol and drug problems*. Vol 4. New York: Plenum, 1978.

(Accepted 4 July 1980)

SHORT REPORTS

Neonatal necrotising enterocolitis: comparative study in three large maternity hospitals

In the past decade numerous American and British reports have confirmed an alarming increase in the incidence of neonatal necrotising enterocolitis. The incidence has been reported to be from 0.3% to 7.5% among infants admitted to neonatal intensive care units, rising to 27% in babies weighing less than 1200 g.¹ Because we seemed to be seeing far fewer cases than centres in Britain and America we designed a prospective study to determine the incidence in Dublin.

Patients and results

From September 1976 to August 1978 all infants with confirmed necrotising enterocolitis who had been born in maternity hospitals A, B, and C were included in the study. The diagnostic criteria were the same in all three hospitals, consisting of clinical signs of abdominal distension, vomiting, blood in stools, and septicaemic appearance together with radiographic evidence of intramural gas, portal venous gas or pneumoperitoneum, or both, or by appearances at surgery or necropsy.

Fourteen neonates among the 42 992 babies born during the two-year period were diagnosed as having necrotising enterocolitis—an incidence of 0.03%. Thirteen out of the 14 were born in hospital A, only one was born in hospital B, and none was born in hospital C (table). The perinatal mortality rates for infants born in hospital A, B, and C in 1977 were 15.9, 19.4, and 19.8 per 1000 live births. The 13 cases in hospital A were scattered throughout the period of study. Ten cases were diagnosed on clinical and radiological features, two at operation, and two at necropsy. Nine out of the 14 were boys and five were girls. Their gestational ages ranged from 29 to 41 weeks

(mean 35.5): five were born at full term. Three weighed less than 1500 g, six 1500-2500 g, and five over 2500 g at birth. Five-minute apgar scores ranged from 7 to 10. The age at which symptoms began ranged from 2 to 17 (mean 6.7) days. Pregnancy was complicated by hypertension in one case, antipartum haemorrhage in two, caesarean section in two, and prolonged

Incidence of neonatal necrotising enterocolitis (NEC) among total number of births in three maternity hospitals

Hospital	Cases of NEC (No)	Total births (No)	%
A	13	14 210	0.1
B	1	13 463	0.008
C	0	15 319	0
Total	14	42 992	0.03

rupture of membrane in one. Neonatal complications included mild hyaline membrane disease in two babies, recurrent apnoea in four, jaundice in seven, patent ductus in five, umbilical vein catheterisation in two, and cardiac catheterisation in one. Four of the 14 infants had not been fed before the onset of necrotising enterocolitis, one was fed only clear fluids, eight received SMA, and one Ostermilk feeds.

Comment

The most interesting point that emerges from this prospective study is the remarkably low overall incidence of necrotising enterocolitis and the striking difference in the incidence in three large maternity hospitals in Dublin. Three possible explanations may be offered for the difference in incidence. Firstly, an increased awareness of the disease in hospital A may have increased diagnostic accuracy. This

seems unlikely because the clinically missed serious cases in the other two hospitals should have been picked up at necropsy, especially in hospital C where the necropsy rate is virtually 100%. Secondly, the higher incidence of the NEC condition in hospital A may be related to an aggressive management of low-birthweight sick neonates in that hospital. Although the perinatal mortality rate in hospital A was lower than in hospitals B and C—indicating that more neonates, particularly premature ones, survived—the infants with necrotising enterocolitis had higher birthweights and apgar scores and had more full-term neonates among them than has been reported for cases from other centres. Thirdly, the higher incidence may be related to the introduction of procedures that have undefined complications and necrotising enterocolitis may represent a new iatrogenic disease caused by some change in clinical practice, perhaps related to the management of labour or the immediate post-delivery period.

We thank the medical and nursing staffs of the three maternity hospitals for their co-operation.

¹ Book LS, Herbst JJ, Atherton SO, Jung AL. Necrotising enterocolitis in low birth weight infants fed on elemental formula. *J Pediatr Surg* 1975; **87**:602-5.

(Accepted 9 May 1980)

Children's Research Centre, Our Lady's Hospital for Sick Children, Crumlin, Dublin 12, Ireland

P PURI, MS, associate paediatric surgeon

E J GUINEY, MCH, professor of paediatric research

Ophthalmia neonatorum due to beta-lactamase-producing gonococci

Penicillin is highly effective in treating babies with gonococcal ophthalmia. The prospect of seeing ophthalmia neonatorum caused by β -lactamase-producing gonococci has caused dismay. One case, successfully treated with kanamycin, has been reported from Singapore.¹ We report here on premature identical twins with this condition born in London of Ghanaian parents.

Case reports

Twin 1 was born at 2238 on 27 November 1979 after 28 weeks' gestation and weighed 1250 g. Next morning there was scanty crusted discharge on the lid margins of the left eye with slight conjunctival congestion. The right eye appeared normal. A conjunctival smear from the left eye contained 30 polymorphs/high-power field ($\times 1000$) but no organisms; a smear from the right eye contained only epithelial cells. Cultures were taken. Twenty-six hours later, on 29 November, both eyes were swollen, particularly the left. When the eyelids were separated yellow-green pus escaped under pressure. Smears from both eyes contained 200 polymorphs/high-power field with Gram-negative intracellular diplococci.

Twin 2 was born six minutes after his brother and weighed 1280 g. Because of his brother's conjunctivitis he was also seen. The eyes appeared normal. Conjunctival smears contained only epithelial cells. Cultures were taken. Twenty-six hours later there was mild conjunctivitis; a conjunctival smear from each eye contained 20 polymorphs/high-power field and scanty Gram-negative intracellular diplococci.

The father had attended elsewhere because of urethral discharge. A β -lactamase-producing gonococcus was cultured. Spectinomycin, 2 g intramuscularly, produced a good response. The infection had been acquired in Ghana.

The mother was examined on 30 November. No Gram-negative diplococci were found in smears from the urethra, cervix, or rectum, but a β -lactamase-producing gonococcus was grown from the urethra and cervix. Cultures for *Chlamydia* and micro-immunofluorescence for antichlamydial antibody were negative. She was treated with co-trimoxazole, four tablets twice daily for two days, plus spectinomycin, 2 g intramuscularly daily for two days. Follow-up tests on two occasions were negative.

Treatment of twins—From 29 November the conjunctivae of both babies were flooded with sulphacetamide eye drops (BPO; 30%) every six hours. The babies also received erythromycin suspension, 40 mg/kg/day every six hours, by drip feed. The gonococci isolated from both babies produced β -lactamase. The organisms were sensitive to tetracycline, erythromycin, sulphonamides, co-trimoxazole, streptomycin, kanamycin, gentamicin, spectinomycin, and cefuroxime. Gonococci were isolated from both eyes and

the rectum but not the throat, gastric aspirate, or blood in twin 1, and from only the left eye in twin 2. Twenty-four hours after the start of treatment twin 1 showed considerable improvement but Gram-negative intracellular diplococci were still present in the left conjunctiva. The mild conjunctivitis in twin 2 had largely cleared, but a few Gram-negative intracellular diplococci were still present. Despite the clinical improvement the erythromycin was replaced by cefuroxime 100 mg/kg/day intramuscularly in three divided doses for seven days. Material taken at the same time as the smears gave negative cultures. Improvement continued, and further follow-up smears and cultures gave negative results, as did all cultures for *Chlamydia*.

Comment

Strains of gonococci that produce β -lactamase are common in the Far East and probably in parts of West Africa.² Although they are rare in the United Kingdom, they may well become more common. Their advent has created further problems in the treatment of gonorrhoea, particularly in pregnant women and babies, for whom the choice of drugs is limited. All strains of gonococci should be tested for β -lactamase production so that appropriate treatment is given as soon as possible. Prompt tracing of sexual contacts is essential.

The recovery of gonococci from sites other than the eye points to the necessity for systemic antgonococcal treatment in babies with gonococcal ophthalmia.

We are grateful to Dr G J A I Snodgrass for referring the babies, and to Dr S Darougat and Mr J Trehan of the Institute of Ophthalmology, London, for the tests for *Chlamydia*.

¹ Pang R, Teh LB, Rajan VS, Sng EH. Gonococcal ophthalmia neonatorum caused by beta-lactamase-producing *Neisseria gonorrhoeae*. *Br Med J* 1979; **i**:380.

² Perine PL, Morton RS, Piot P, Siegel MS, Antal M. Epidemiology and treatment of penicillinase-producing *Neisseria gonorrhoeae*. *Sex Transm Dis* 1979; **6**:152-8.

(Accepted 6 May 1980)

Whitechapel Clinic and Venereal Diseases Reference Laboratory, London Hospital, London E1

E M C DUNLOP, MD, FRCP, consultant venereologist

P RODIN, MB, FRCP, consultant venereologist

A D SETH, MSc, senior microbiologist

B KOLATOR, BSc, senior microbiologist

Nocturnal enuresis and the buzzer alarm: role of the general practitioner

As a paediatric registrar in Scotland I was struck by the number of children with enuresis attending the paediatric clinic who had failed to be cured by the buzzer alarm. A retrospective study was performed to determine exactly how effective the buzzer had been.

Patients, methods, and results

The notes of patients given a pad and buzzer over a two-year period from January 1976 to December 1977 were studied. The children were attending the paediatric clinic at one of two hospitals: hospital A, a small general hospital; and hospital B, a large teaching hospital. If the paediatrician thought that patients were suitable for treating with the buzzer alarm*, their names were put on the waiting list (several months' wait at each hospital). When the buzzer was collected its use was demonstrated by the ward sister (hospital A) or the ward receptionist (hospital B). After issuing the buzzer, patients were seen on average one to two months later. The notes of 22 patients were studied from hospital A and 40 from hospital B. All the children were over 5 years of age, most being over 7: 50% of those attending hospital A had difficulty using

*The alarms used in hospital A were the Astric alarm from Astric Products Limited, 261 Queen's Park Road, Brighton, Sussex; and the Chiron alarm from Down Brothers and Mayer and Phelps Limited, Church Path, Mitcham, Surrey. Hospital B used the Eastleigh alarm from N H Eastwood and Son Limited, 48 Eversley Park Road, Winchmore Hill, London N2.