cannot always be proved despite the common association with poor oral hygiene, alcoholism, and fits, but at least the abscess is secondary to pneumonia. A. J. Block and colleagues[8] note the declining frequency of this disease and could find only 79 examples in a recent ten-year review of patients admitted to the Johns Hopkins Hospital. Experience in Britain must be similar owing to the early treatment with antibiotics of patients threatened with pneumonia.

Though surgical treatment was formerly to be preferred, the management of this formidable disorder is now almost entirely by medical means. The choice of antibiotic is influenced to some extent by the nature of the bacterial flora in the sputum. Often no pathogens can be isolated, especially if antibiotics are given before bacteriological tests are done. Among the aerobic organisms that may be found are pneumococci, streptococci, klebsiellae, and miscellaneous Gram-positive and Gram-negative bacteria. Anaerobes should always be sought and are usually present when the sputum is foetid. In practice penicillin is the antibiotic of choice, given in a dose of 4-8 million units a day for three to six weeks according to the severity of the infection, with a smaller dose subsequently if healing is delayed. Bronchoscopy is usually desirable, to exclude other disease such as carcinoma. Postural drainage and the inhalation of warm, humidified air are valuable accessory measures. Surgical resection has little or no place during the first few weeks of treatment, unless a suspicion of carcinoma arises. Later it may be necessary for chronic sepsis in a destroyed lung with bronchiectasis, or possibly for recurrent infections of an open cavity which persist despite prolonged medical treatment.

Metabolic Effects of Oral Contraceptives

At a symposium held last September by the Associations of Clinical Pathologists and of Clinical Biochemists on the biochemical consequences of oral contraceptives disquiet was expressed about the untoward consequences of taking these hormones. It is valuable, therefore, to have the experts' conclusions published for more deliberate consideration in a supplement to the *Journal of Clinical Pathology*.[1] It brings into sharp focus one aspect of the control of reproduction, reviewed in a more general way this year in the *British Medical Bulletin*.[2 3]

The ten contributions in the supplement cannot range over all the effects of oral contraceptives, but they do explore in some detail the main biochemical consequences. Not surprisingly the vascular effects feature prominently. Much of the definitive work on them has been done in Great Britain by Professor Richard Doll, F.R.S., and his colleagues, one of whom, Dr. M. P. Vessey, gives an account of the epidemiological relationship between oestrogen-progestogen combinations and venous thrombosis, pulmonary embolism, and cerebral thrombosis. These ill effects are the most disturbing feature of the use of oral contraceptives, and Vessey does well to set the risks in context by comparing them with death rates in a similar population from pregnancy, from cancer, and from motor accidents. Dr. Vessey and Professor Doll, together with Drs. A. S. Fairbairn and G. Glober, report in the *B.M.J.* this week (page 123) on a further aspect of the relation between oral contraceptives and the risk of thromboembolism. They found that the risk of its occurring after surgical operation was raised some three to four times among women taking oral contraceptives before the operation.

L. Poller's contribution to the symposium complements Vessey's by showing what changes are brought about in blood clotting factors by oral contraceptives, and he observes with admirable restraint that they do not appear to be a desirable side-effect. The thrombotic hazards of the pill are further explored in another article on the effect of oestrogens on platelet action, and members of the Medical Research Council's unit in Glasgow discuss the increase in blood pressure in some women that may result from the effects of oral contraceptives on plasma renin and renin substrate.

It is possible that many of the metabolic effects of oral contraceptives—for example, their effect on carbohydrate metabolism—follow upon their effect on cortisol metabolism. C. W. Burke records the evidence that oestrogen-containing oral contraceptives increase the blood concentration of both free and bound cortisol. He is critical of the idea that this finding implies an increased overall exposure of the tissues to cortisol, and he points out that free cortisol excretion in the urine over 24 hours is only trivially increased by treatment with oral contraceptives. Nevertheless, V. Wynn and J. W. H. Doar in their contribution attribute the impaired glucose tolerance of women on the pill to the raised plasma cortisol, and it is possible that other effects on liver function recorded elsewhere in the supplement are related to altered corticosteroid metabolism.

In this publication the oestrogens are blamed time and again for unwanted side-effects. Thus oral contraceptives consisting of progestogens only should not be hastily condemned. But at best they are a stopgap measure, much less effective as contraceptives than the oestrogen-progestogen mixtures. The searching examination which the symposium devotes to the side-effects of oral contraceptives does not make a case for discontinuing them, but it does imply that the present ones should be replaced as soon as equally simple and effective means can be devised which are less of an endocrinological insult.

Neonatal Necrotizing Enterocolitis

Necrotizing enterocolitis is a well-recognized but incompletely understood disorder of early infancy, affecting particularly premature infants and those who have had exchange transfusions.[1-7] It usually begins in the first week of life, though cases have occurred in later infancy.[6]

The infant will commonly have suffered from birth asphyxia, hyaline membrane disease, apnoeic attacks, or jaundice. Feeds begin to pool in the stomach, and the baby may vomit; the vomit or gastric aspirate become bile-stained. The abdomen distends and bowel sounds may disappear. (These early signs are those of intestinal obstruction, which has many possible causes in the neonatal period.[8]) The baby sometimes passes no stools but, more frequently, small amounts of blood-stained stool. Frank diarrhoea is rare. In severe cases perforation of the ileum or colon may occur, leading to peritonitis, shock, generalized sepsis, and death. The mucous membrane of the gut, especially in the terminal ileum and ascending colon, undergoes haemorrhagic necrosis.[1 2 6 7] Areas of mucosa may slough off, and in other areas there are submucosal gas-filled cysts.

[1] *The Pill: Biochemical Consequences*, ed. M. Sandler and B. Billing. Supplement to the *Journal of Clinical Pathology*. London, British Medical Association, 1970.
[2] *British Medical Bulletin*, 1970, **26**, No. 1.
[3] *British Medical Journal*, 1970, **1**, 449.

The most helpful special investigation is a plain abdominal *x* ray.[2 3 4 6 7 9 10] In the early stages this may show only dilated loops of small bowel, but the radiological hall-mark usually seen is pneumatosis intestinalis—linear streaks or bubbles of gas beneath the intestinal mucous membrane. When perforation has occurred there will be free gas in the peritoneal cavity, and in advanced cases gas may be seen in the hepatic portal venous system. This is an ominous[6 11] but not invariably fatal sign.[7 12 13] The immediate management of a baby with this condition is to stop oral feeds and start intravenous fluids and gastric suction. If umbilical catheters are present they should be removed if possible, for they may compromise the splanchnic circulation. Antibiotics effective against bowel flora should be given. Kanamycin with penicillin is probably the first choice, but if blood culture grows *Pseudomonas*, or if the baby is known to have been heavily colonized by this organism, polymyxin should be added or carbenicillin with gentamycin substituted. The most difficult decision is whether and when to intervene surgically. These infants withstand surgery poorly,[6 8] and recovery is certainly possible with conservative management, though this may need to be prolonged. There is a fair measure of agreement that operation is necessary when the bowel perforates, but probably not before[3 4 6]; serial *x*-rays may help to make a decision.[6] However, J. K. Stevenson and colleagues[7] favour operation in a baby whose condition is deteriorating and in whom perforation is probably impending. Operation consists in resection of perforated and necrotic gut, probably accompanied by colostomy or ileostomy rather than anastomosis.

The possibility that the infant may have Hirschsprung's disease must be considered, especially in a boy. Long-term follow-up is in any case necessary, since colonic stricture may occur as a late complication of enterocolitis.[14]

The aetiology of necrotizing enterocolitis is uncertain, but three possible factors are infection, intestinal ischaemia, and stasis of intestinal contents. A pathologically similar form of enterocolitis attacks older people as a result of infection of the bowel wall with gas-forming organisms such as clostridia.[15–19] Enterocolitis occurs in the newborn at the time when the bowel is first being colonized by bacteria, and blood cultures are often positive for a variety of faecal organisms, including *Escherichia coli* and *Pseudomonas*.[1 3 4 6] Some authors have considered intestinal ischaemia to be the primary cause,[4 6 7 20] for ischaemic colitis certainly occurs in older patients with chronic heart failure or other causes of impaired circulation to the gut.[21–23] Babies who develop enterocolitis have frequently suffered hypoxia, and it is argued[20]—though not proved[24]—that this may divert blood away from the gut as a result of something akin to the diving reflex of the seal.[25] The enterocolitis and colonic perforations occurring after exchange transfusion are most easily explained by interference with the splanchnic circulation.[26–29] Stasis of intestinal contents is another possible factor. It may occur in sick premature infants as a result of functional ileus,[30 31] delay in passing meconium, or even obstruction by inspissated milk curds,[32] and it seems the likeliest initiating factor in the enterocolitis which complicates Hirschsprung's disease.[32] Perhaps temporary intestinal hold-up or ischaemia allows the bowel flora to invade the mucosa, and progressive infection and gas formation lead to necrosis and perforation.[9] However, another ingenious hypothesis[34–36] is that a local Shwartzman reaction[37] may be involved: the bowel wall is sensitized by the somatic antigens of the gut flora, and subsequent bacteraemia may then cause mucosal necrosis. S. E. Wilson and M. M. Woolley[6] found thrombocytopenia, which is characteristic of the Shwartzman reaction,[38 39] in 9 out of 16 cases of necrotizing enterocolitis.

The disease is apparently becoming commoner in neonatal units, probably as a result of longer survival of very ill premature babies and better recognition of the condition. However, as with other neonatal problems, it must be asked whether some aspect of neonatal care may predispose to it. Doubts have been expressed about the safety of polyvinyl chloride (P.V.C.) tubing in exchange transfusion sets,[40] and P.V.C. umbilical catheters are often used in the treatment of sick newborn babies. There is no direct evidence that their use, or modern feeding practices, lead to enterocolitis, but the question must remain open till the aetiology of the disease is better understood.

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