

placenta showed chorioamnionitis in 36% as compared with 11% in controls.

The early clinical picture is non-specific and usually consists of lethargy, raised or subnormal temperature, anorexia, vomiting, and irritability. The classical signs of neck stiffness or bulging fontanelle are rarely present. Signs and symptoms of grave neurological disturbance develop in the later stage of the disease: coma, convulsions, opisthotonus, and bulging fontanelle are common and of grave prognostic significance. "Blind" antibiotic therapy before lumbar puncture leads to delay in diagnosis and may render bacteriological identification impossible. Any infant who has symptoms suggestive of meningitis should have his cerebrospinal fluid examined. Blood should also be obtained for culture not only because the same organisms are found in two-thirds of all cases but because occasionally blood culture alone will give bacteriological evidence. If the cerebrospinal fluid becomes blood-stained during withdrawal and is unsuitable for cell count and biochemical test, it should nevertheless be sent for culture.

Treatment should begin as soon as these samples have been obtained. Any delay aggravates the prognosis. Antibiotic drug or drugs can be chosen according to the likely causative organism in the individual case. The initial choice might be guided by clinical features or by the immediately available result of the Gram stain on the organisms in the cerebrospinal fluid, or from any available culture of organisms from maternal infections, or from an earlier local infection of the infant. The drug regimen must be reviewed when sensitivity tests become available and changed if necessary. The choice of drugs is now large, but the published results are disappointing. Fifteen of Overall's 25 patients died. This 60% mortality rate is barely better than reported by others in larger series of cases.<sup>2 5-8</sup>

In view of the relative rarity of the condition, the varied bacteriology, and the frequent introduction of promising new antibiotic drugs it has not been possible to determine by controlled trials which drug or combination of them is the best for an individual case.

The treatment follows no uniform plan in any of the larger series of cases reported, all of which were retrospective analyses of patients admitted over periods of many years. Chloramphenicol, streptomycin, kanamycin, and many others have been given, singly or in combination. There is no evidence that a combination of drugs is more efficient than a single one, as long as adequate bactericidal concentration of the correct drug is attained in the cerebrospinal fluid.<sup>4</sup> There is little published information about the value of intrathecal therapy, yet most drugs appropriate for the treatment of meningitis can be given intrathecally. If intrathecal therapy is started at the time of the initial diagnostic lumbar puncture, a high antibiotic concentration in the cerebrospinal fluid can be obtained without delay, with a promise of better results.

Though it would be eminently desirable to prevent neonatal meningitis, there is little proof that this can be achieved. There are no prospective controlled trials in anatomically normal babies, and in an earlier trial in babies born with myelomeningocele the results were disappointing.<sup>9</sup> It is known that neonatal meningitis can occur in spite of systemic antibiotic therapy. Nevertheless, it is common practice to provide antibiotic protection for those infants at the highest risk. These are the infants who have suffered fetal distress, who were born after premature rupture of the membranes or substantial obstetric complications, or whose mothers had perinatal infections,<sup>10</sup> especially if the infant is premature.

## Hygiene in Food Shops

The typhoid epidemic at Aberdeen in 1964<sup>1</sup> almost certainly originated from a single can of corned beef, but not all the numerous victims ate meat from it. There is every reason for believing that in this and similar outbreaks other meat was contaminated from surfaces with which the infected material had been in contact, notably slicing machines but including any surface on which such food is laid. Since this disaster there has naturally been an access of interest in methods whereby contamination of one food by another can be prevented. The official report of the Aberdeen outbreak<sup>2</sup> recommended that there should be some system of testing solutions used for cleansing and disinfection in food premises, since the use of such a solution is generally the only feasible way of removing contamination.

A study of methods for such tests, and of the merits of different reagents for this purpose, has been made by R. J. Gilbert.<sup>3</sup> The work was done in a large self-service store, and the surfaces sampled were those of a slicing machine, a carving knife, a plastic display dish, a Formica working surface, and a wooden chopping table. Two methods were used for making bacterial counts of measured areas on these surfaces. In the first an alginate swab is rubbed over the area. It is then dissolved in quarter-strength Ringer's solution containing any necessary neutralizers if the surface has been treated with disinfectant, and plate cultures are made from an aliquot of this fluid. The second is the "agar sausage" method devised by L. Ten Cate,<sup>4</sup> employing nutrient agar in a sausage casing 3.4 cm. in diameter and 17 cm. long. The end of this sausage is cut off and the flat surface applied to the area to be sampled. A slice 0.5 cm. thick is then taken off the end and placed in a Petri dish, leaving a fresh surface for the next sampling. The sausage itself is protected from contamination by the hand holding it by its casing. By this means many areas can be simply and economically sampled in a short time. The method gives much lower counts than swabbing, but the author commends it as a routine control method for use by public health inspectors, and particularly for providing food handlers with a visual demonstration of the presence of bacteria on surfaces for which they are responsible.

The results of comparing the efficacy of different reagents were clear-cut and should be of great practical interest to public health authorities and the retail food industry. An oil intended for the cleaning of slicing machines gave generally unsatisfactory counts. The reductions in bacterial counts produced by all other treatments were substantial but very different in degree. An anionic detergent used alone was more effective than a hypochlorite solution (200 parts per million) used alone, evidently because the cleansing effect is even more important than bactericidal action. Intermediate results were given by mixtures of an anionic detergent and chlorinated trisodium phosphate or a quaternary ammonium compound. Much the largest and most consistent reductions in bacterial counts were given by applying first the anionic detergent and then the hypochlorite solution. This procedure takes a little more time, but the results fully justify it and are indeed what might be expected. The detergent cleanses the surface of grease and other material and leaves the field clear for the full and rapid bactericidal effect of hypochlorite. It is

<sup>1</sup> *British Medical Journal*, 1964, 2, 1652.

<sup>2</sup> Scottish Home and Health Department. *The Aberdeen Typhoid Outbreak*, Cmd. 2542. Edinburgh, H.M.S.O., 1964.

<sup>3</sup> Gilbert, R. J., *Journal of Hygiene*, 1970, 68, 221.

<sup>4</sup> Ten Cate, L., *Journal of Applied Bacteriology*, 1965, 28, 221.

to be hoped that the lesson of these tests will be learned and generally applied.

## Technique and Survival in Cancer Surgery

Carcinoma of the large bowel is the second commonest fatal cancer in England and Wales, where each year about 8,500 patients die of colonic and another 5,500 of rectal neoplasms. Most of these patients have had an attempt at surgical cure; for example, E. M. Oxley and H. Ellis<sup>1</sup> found that of 640 patients with large bowel cancer submitted to laparotomy at Westminster Hospital only 112 (18%) had liver metastases and were therefore suitable for no more than palliative treatment. Patients often die, in fact, of recurrence of the disease after an apparently successful removal of the growth.

Most surgeons believe that distant metastases found after resection represent foci which were occult at the initial laparotomy. There is, however, a body of opinion that in some cases at least handling of the tumour at the time of operation might have detached cancer emboli. In 1913 E. E. Tyzzer showed<sup>2</sup> that digital trauma to tumours implanted in the chest wall of mice resulted in extensive metastases compared with controls. E. R. Fisher and R. B. Turnbull found cancer cells in the portal blood in 8 out of 20 patients undergoing resection of cancer of the colon.<sup>3</sup> Since then Turnbull and his colleagues<sup>4</sup> have been advocating and practising what has been named the "no-touch isolation technique" of colonic resection, in which extreme care is taken not to palpate the tumour mass in the ward and the x-ray departments or by vigorous scrubbing in the preoperative skin preparation. At operation the cancer-bearing segment is not handled until the lympho vascular pedicles have been divided and ligated and the colon divided. The results of this technique between 1950 and 1964 were described by Turnbull in his recent Moynihan Lecture at the Royal College of Surgeons of England.<sup>5</sup> Compared with his surgical colleagues not using this technique, Turnbull found improvement in his five- and ten-year survival rates, particularly in his class C cases with tumour metastases to regional lymph nodes but with no clinical or radiological evidence of distant spread. In this group the five-year survival rate was 67.3%.

In assessing Turnbull's results it is important to notice that his classification of staging is a little different to that used in many other centres: his stage D comprises not only patients with distant tumour metastases and peritoneal seeding but also those with adjacent organ invasion. Of the 205 patients in this last group, half underwent resection. It would be interesting to compare Turnbull's results with those obtained at

other major centres reclassified according to the staging used at the Cleveland Clinic. At St. Mark's Hospital the survival rate after perineo-abdominal excision of the rectum, in which the vascular pedicle is not controlled until after considerable manipulation of the tumour, is very similar to that after the abdomino-perineal technique, in which it is.<sup>6</sup>

A somewhat different approach to this problem has been the use of intraluminal chemotherapy at the time of surgery to perfuse the lympho-venous drainage area of the tumour.<sup>7</sup> There is a suggestion that survival figures are improved in those patients with lymph node metastases, but further long-term results are needed before the value of such anti-cancer chemotherapy can be evaluated.

Local recurrence of the tumour after resection may result from inadequate excision or from implantation of free tumour cells at the anastomotic line. In restorative resection of the rectum such recurrences were reported in approximately 10% of cases by J. C. Goligher in 1951.<sup>8</sup> However, since the introduction by Naunton Morgan and Lloyd-Davies of irrigation with a 1/500 solution of perchloride of mercury, anastomotic recurrence has been reduced<sup>9</sup> to about 2%. Hale has confirmed<sup>10</sup> experimentally that both mercury perchloride and a 1% solution of cetrimide are highly effective in preventing tumour implantation at the suture line.

So while it is clear that local implantation of cancer cells in the wound and suture line can occur and can be prevented, the danger of causing distant metastases by operative manipulation is less solidly founded. Tumour cells may certainly be recovered in the blood of patients at the time of operation, but their powers of implantation are still conjectural. There can be no complacency about the results of surgery in large bowel cancer when so many patients die each year of this disease. While surgeons strive to improve the minutiae of their techniques much still remains to be discovered about the fundamental mechanism of the development of distant metastases. On this will certainly depend future advances in treatment; since, as Osler said, "As is our pathology, so is our treatment."

## Give and Take

The Chancellor's recent announcements<sup>1 2</sup> on Government expenditure merit attention, not just for the arithmetic but because they give some indication of the Conservative administration's future intentions. The financial proposals for the Health Service are reported at p. 377 and though the proposals lack detail they show that the new Health Service charges will bring in an estimated £53m. a year by 1974-5. These charges represent a potential saving for the Government, but it announced that part of these savings in public expenditure would be switched to those parts of the health and welfare services which are in greatest need, particularly facilities for the aged and mentally handicapped. As the White Paper<sup>2</sup> puts it "The forward expenditure plans have therefore been adjusted to provide for new expenditure amounting to £110m. over the years 1971-2 to 1974-5." Nevertheless, even with this "new" expenditure of approximately £37m. a year the Chancellor should be saving around £16m. annually

<sup>1</sup> Oxley, E. M., and Ellis, H., *British Journal of Surgery*, 1969, 56, 149.

<sup>2</sup> Tyzzer, E. E., *Journal of Medical Research*, 1913, 28, 309.

<sup>3</sup> Fisher, E. R., and Turnbull, R. B., *Surgery, Gynecology and Obstetrics*, 1955, 100, 102.

<sup>4</sup> Turnbull, R. B., Kyle, K., Watson, F. R., and Spratt, J., *Annals of Surgery*, 1967, 166, 420.

<sup>5</sup> Turnbull, R. B., *Annals of The Royal College of Surgeons of England*, 1970, 46, 243.

<sup>6</sup> Bussey, H. J. R., Dukes, C. E., and Lockhart-Mummery, H. E., in *Cancer of The Rectum*, ed. C. E. Dukes, p. 267. Edinburgh, Livingstone, 1960.

<sup>7</sup> Rousselot, L. M., Cole, D. R., Grossi, C. E., Conte, A. J., and Gonzalez, E. M., *Cancer (Philadelphia)*, 1967, 20, 829.

<sup>8</sup> Goligher, J. C., Dukes, C. E., and Bussey, H. J. R., *British Journal of Surgery*, 1951, 39, 199.

<sup>9</sup> Keynes, W. M., *Annals of Surgery*, 1961, 153, 357.

<sup>10</sup> Hale, J. E., *Proceedings of the Royal Society of Medicine*, 1969, 62, 713.

<sup>1</sup> Hansard, House of Commons, 27 October 1970, Col. 37.

<sup>2</sup> *New Policies for Public Spending*, Cmnd. 4515, London, H.M.S.O., 1970.

<sup>3</sup> Miller, H., *Encounter*, 1967, 4, 11.

<sup>4</sup> Office of Health Economics, *Information Sheet No. 9*, London, 1970.

<sup>5</sup> *British Medical Journal*, 1970, 4, 192.

<sup>6</sup> *Medical Research Council Annual Report April 1969-March 1970*. House of Commons Paper 9, London, H.M.S.O., 1970.