BRITISH MEDICAL JOURNAL

LONDON SATURDAY 30 OCTOBER 1971

Operations for Obesity

Obesity is a killing disease, and it is preventable. Fat people are fat because they eat too much; if their intake is reduced enough they will lose weight. The uniformly lean physique of concentration camp inmates or of the survivors of recent civil wars emphasizes this point, which can be proved more prosaically in the controlled environment of a metabolic ward. Except for the occasional patient who has a specific cause for obesity, such as hypothyroidism or Cushing's syndrome, all obese patients eat too much for their needs, and the remedy is simple. They must eat less.

But in practice treatment is very difficult. Many obese people are gluttonous. Others, convinced that they eat very little and that dieting would be pointless, demand some magic pill or potion that will make "their too, too solid flesh" melt away. Exhortations to consume less sugar and starch, eat more fruit, vegetables, and protein, drink less alcohol, and take more exercise are greeted with scant enthusiasm. Fat people tend to remain fat or to get fatter. Thus they remain exposed to increased risks from diabetes, hypertension, bronchitis, osteoarthritis, and other ailments, have more accidents, and live under social and economic handicaps. Fat people die young, fat men in particular.

Since medical treatment is so often unsuccessful, it is not surprising to find that surgical procedures are now being tried in the treatment of obesity. Nearly all the operations involve some form of small-intestinal "shunt" or bypass, which limits the area available for absorption of nutrients, so producing malabsorption and loss of weight. The difficulty has been to develop an operation which would regularly reduce the patient's weight to near the ideal level without producing severe side effects such as diarrhoea, malnutrition, or even death. Bypass of most of the small intestine and half of the colon by end-to-side anastomosis of the proximal 15 in. (38 cm) of jejunum to the mid-transverse colon[1] certainly produced impressive loss of weight, but side effects were severe and a second operation was necessary to restore additional bowel length when the ideal weight was attained. Less radical procedures, such as end-to-side jejuno-ileostomy, were tried next.[2-4] This was the "14+4 operation," so called because the proximal 14 in. (36 cm) of jejunum are anastomosed end-to-side to the terminal ileum 4 in. (10 cm) proximal to the ileo-caecal valve. Bypass of such a large proportion of the small intestine produces severe steatorrhoea and weight loss. In addition serum cholesterol and triglyceride levels are greatly reduced. Bypass of only the distal one-third of the small intestine, on the other hand, produces a much more selective malabsorption[5] of vitamin B_{12}, cholesterol, and bile salts, lowers serum cholesterol and triglyceride concentrations, but does not produce weight loss. The latter procedure is thus particularly suited to the patient who has hyperlipidaemia without obesity. It has been used in children and adolescents with familial hyperlipidaemia in an attempt to prevent the development of severe cardiovascular complications.[6]

In a careful evaluation of several bypass operations in dogs P. A. Salmon[7] found that jejuno-transverse colostomy produced malnutrition, electrolyte imbalance, and rapid loss of weight, resulting in death of the animals, whereas end-to-side jejuno-ileostomy was associated with few side effects but produced inadequate weight loss. End-to-end anastomosis of the proximal 20 cm of jejunum to the distal 40 cm of ileum (the defunctioned loop being drained into the sigmoid) gave the best results, with weight loss that was maintained for five years. Deficiences of ions such as potassium and calcium were of minor degree, and the fatty infiltration of the liver found on biopsy at one year disappeared on longer follow-up. Encouraged by these findings, Salmon and his co-workers went on to treat 120 obese patients by end-to-end anastomosis of the proximal 10 in. (25 cm) of jejunum to the distal 20 in. (50 cm) of ileum. At follow-up six months to four years later two-thirds of the patients were within 20 lb (9 kg) of their ideal weight and only six had failed to lose weight satisfactorily. Diarrhoea was troublesome in 25% of patients at one year but in only 13% at two and three years; 41% developed hypokalaemia or hypocalcaemia of minor degree. Four patients had severe potassium deficiency requiring intensive therapy, and eight patients required calcium therapy. Fatty infiltration of the liver was common. Five of the 120 patients died of the operation.

Intestinal bypass for obesity is still an experimental procedure. The results obtained so far in the dog and in man suggest that an end-to-end jejuno-ileal shunt yields more certain results than an end-to-side shunt. Diarrhoea is less if the ileo-caecal valve is retained and if none of the colon is bypassed. The distal end of the bypassed segment is

anastomosed to the colon, and the proximal end is closed and anchored securely, because of the danger of intussusception. The operation itself is a formidable one. Use of a transverse "melon-slice" incision permits excision of great masses of "fatty apron" and of the umbilicus, together with the hernia that is so often present. The appendix is removed as a routine, and cholecystectomy is often required because as many as 40% of these patients have, or have had, gall stones. The wound must be closed with scrupulous care, and respiratory support may be needed in the early postoperative period. These patients run higher than average risk of developing wound infection, wound dehiscence, and pulmonary embolism. A careful watch must be kept on fluid and electrolyte balance, supplements of potassium and calcium often being needed.

Loss of weight results from malabsorption of fat and protein. The fat-soluble vitamins are poorly absorbed after operation, and deficiency of vitamin B_{12} is likely to develop after bypass of most of the ileum. Diarrhoea may be very troublesome and may cause intense discomfort at the anus. Osteomalacia, osteoporosis, and cirrhosis of the liver have not yet been found after these bypass procedures, but may well appear on longer follow-up.

If bypass of the small intestine has a place in the treatment of obesity, it would seem logical to restrict its use initially to those vastly obese patients who are 50 kg overweight or twice their ideal weight, and who have failed to lose weight despite at least five years of medical management. Though the operation is in general too hazardous for elderly or unfit people, the presence of diabetes, mild hypertension, or hyperlipidaemia would constitute a relative indication for it, since improvement in these conditions is likely afterwards. It is important that the patient herself should be of stable personality and judged likely to cooperate in the extensive investigations which are still essential, both before and for several years after these radical procedures. Recently polyarthritis has been reported as a complication of the operation in seven patients who underwent jejunocolostomy out of a series of 22 who had this operation and nine who had jejunoileostomy.[8] In two the polyarthritis was persistent and one of these underwent a revision of her intestinal shunt, with the result that her arthritis disappeared.

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[4] Scott, H. W., Jun., Law, D. H. IV, Sandstead. H, H., Lanier, V. C., Jun., and Younger, R. K., *Annals of Surgery*, 1970, **171**, 770.
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[6] Buchwald, H., Moore, R. B., Frantz, I. D., Jun., and Varco, R. L., *Surgery*, 1970, **68**, 1101.
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Prenatal Diagnosis

Techniques have recently been developed for examining the chromosomes of the unborn fetus. They constitute an important advance in medical practice, for this type of prenatal diagnosis enables doctors to give helpful advice to the mother. The first considerable experience of a British unit was reported recently by M. E. Ferguson-Smith and his colleagues[1] and last week a note appeared on ethical considerations.[2]

The technique consists in obtaining a specimen of amniotic fluid by suprapubic puncture of the abdomen and uterine walls at the 14th to 16th week of pregnancy, culturing fetal amnotic cells and examining them for chromosome abnormalities, and examining amniotic cells (with or without culture) or amniotic fluid for biochemical abnormalities. The operation carries a negligible risk to the mother's health. The risk to the fetus is not yet established, but series of over 200 operations have been reported from America without fetal damage.[3]

The technique of growing amniotic cells—a procedure needed for the proper study of the chromosomes—presents difficulties, but some laboratories are now achieving over 80% success in getting satisfactory chromosome preparations, and the rate may be raised to nearly 100% successful preparations by obtaining a second specimen. Once adequate cell growth is achieved, the reliability of diagnosis of a chromosome abnormality is high and does not differ from that in preparations obtained by lymphocyte or fibroblast culture.

The biochemical techniques for detecting inborn errors of metabolism before birth are at present less reliable. There are encouraging indications that where an enzyme defect is demonstrable in fibroblast culture it will usually also be demonstrable in amniotic cells obtained at the 14th to 16th week of pregnancy. But much study is needed to establish the normal range of values in amniotic cells, uncultured and cultured. These values may differ according to the predominant type of cell in a culture. At present prenatal biochemical diagnosis of a particular enzyme deficiency is best undertaken by the few laboratories with considerable research experience of that particular metabolic error. The most impressive results obtained so far are for Tay-Sachs disease (amaurotic familial idiocy).[4 5]

The strongest indication for amniocentesis at present is when there is a known high risk to the fetus of a disorder susceptible of prenatal diagnosis and the mother is asking for a termination of the pregnancy unless the fetus can be shown to be unaffected. An example of high risk to the fetus is when the mother carries a D/G chromosome translocation giving an approximately 1-in-6 risk of Down's syndrome (mongolism). Another is the 1-in-4 risk of Tay-Sachs disease, which is transmitted as an autosomal recessive, when the parents have already had one child with it. A third is the 1-in-2 risk of Lesch-Nyhan disease (mental retardation, self-mutilation, and faulty purine metabolism) in the son of a woman who is a known carrier of the gene for this X-linked condition. Amniocentesis is also being undertaken when there is a risk of an X-linked condition such as Duchenne muscular dystrophy and the mother is asking for termination of pregnancy unless the fetus can be shown to be female. A less strong indication for amniocentesis is when the risk of abnormality in the fetus is only moderate but the mother is very anxious for termination unless the fetus can be shown to be normal. In this category are some pregnancies to mothers who have already had one child with Down's syndrome and pregnancies to mothers over the age of 40. These circumstances have provided the commonest indications for amniocentesis so far. The stage may come when it would be appropriate for pilot studies to be undertaken in fully equipped centres in which the procedure would be offered to all mothers pregnant over the age of 40. In women of that age the incidence of serious chromosomal abnormalities in the fetus at the age of 14 weeks is about 1 in 50.

Unfortunately there are severe congenital disorders which show no abnormality in chromosomes and as yet no bio-