Clinical Topics

Magnetic continent colostomy device

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For patients, the principal drawback of a colostomy is the loss of faecal continence. To achieve a continent colostomy has long been the goal of surgeons. A magnetic stoma seal became feasible when a strong, light, durable magnet made of samarium-cobalt became commercially available in 1972. This metal compound has the highest magnetic energy per unit volume and loses only a few per cent of its power in 100 years. A magnetic ring coated with Palacos (an acrylate used successfully for many years in orthopaedic surgery) was developed in Erlangen, Germany, and has been used there in clinical trials since 1974.

The ring is implanted in the anterior abdominal wall, either at the time of abdominoperineal resection (primary) or to make an already established colostomy continent (secondary). The colon is brought through the centre of the ring and a mucocutaneous suture performed. After healing the patient may wear a matching outside cover, containing a ring-shaped magnet and a protruding magnet on its central core. The cap is so designed to achieve a nearly constant force of attraction over a distance of 10 to 30 mm.

The development and manufacture of the device have now been taken over by Coloplast International and is being marketed under the name of Maclet. Before making the product commercially available the manufacturers invited several surgeons in Britain and Scandinavia to try the device and keep accurate details of operative technique, complications, and results. The results were verified and the patients interviewed and examined by a nurse/stomatherapist, who visited the 12 or more centres engaged in the trial.

At a recent symposium in London, organised to correlate the preliminary results of the trial and to compare them with the experience from Erlangen, the participants decided that the preliminary results should be published in Britain.

Surgical technique

The stoma site is carefully chosen before operation on a flat part of the abdominal wall away from ridges and creases; often slightly higher than the usual position. The acrylic-covered magnetic ring is sterilised with gas and inserted either through the hole where the skin disc has been excised (25 to 35 mm diameter) or into the subcutaneous fat laterally from the main incision or from within the abdomen. The south pole of the magnetic ring is marked with a rim that must be sited towards the skin. The ring is then fixed in the deeper part of the subcutaneous layer by suturing the superficial fascia to the muscle fascia. The details of this technique appear to be important. After implanting and completely covering the ring, the end of the colon, protected by a rubber sheath, is drawn through the centre hole. After removing adipose tissue and trimming the end of the colon to the appropriate length, a careful primary mucocutaneous suture is performed.

Conventional colostomy management is used for three to six weeks and then the magnetic cap is fitted. A special three-layer sealing washer has recently been developed, the middle layer of which is porous foam filled with activated charcoal. This permits flatus to permeate slowly without noise or odour, and patients keep the cap in position for between 8 and 18 hours daily, using a conventional enterostomy adhesive appliance the rest of the time.

Results

There were 61 patients (55 primary and six secondary implants) of whom six died. One death may have been related to the implantation of the ring. This patient had overwhelming sepsis that might not have occurred if the ring had not been fitted. The other deaths in this short follow-up of less than a year were associated with recurrence of the original malignant disease. The indications for removing the ring from 12 patients were failure of primary mucocutaneous healing or late necrosis of the skin overlying the ring. Of the 43 patients available for review, 22 were not attempting to use the magnetic cap to effect continence. Most of these failures were the result of incomplete continence when wearing the cap—usually because the abdominal wall was too fat, the stools were too loose, the patient was too uninterested or feeble to manage the cap, or the stomal skin aperture was too wide. If the skin aperture was greater than 35 mm, it appeared to leave too much mucous membrane exposed on the surface to permit complete continence.

Of the 21 patients who used the cap regularly, 15 considered themselves to be fully continent. About half of the patients who survived the operation with the ring securely in place were pleased that they had it and were glad of the confidence that continence gave them, either when out in public such as at work or shopping or, in some cases, for the whole of the waking day. Few patients wore the cap during sleep; most preferred to use an adhesive bag.

Disadvantages, that could be called "snags" rather than complica-

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tions, included embarrassment during airport check-in, slight interference caused to some magnetic electronic equipment, and the inadvertent attraction of small ferrous objects. A major snag was the slightly bulky appearance of the present cap as seen through clothes, particularly if the weight of cap and ring tended to tilt the device forwards.

Discussion

The percentage of complications, continence, and patient satisfaction in this series is almost identical with the early experience reported from Germany.^{1,2} The major difference among the series was that more of the German failures were due to obesity and more of the British failures to colostomy siting or size of skin hole.

It must be emphasised that our results are of the early experience in eight centres. Although we all have a special interest and considerable experience in colonic surgery and the creation of stomas, we still encountered problems with our early cases while learning the correct technique, siting, and indications. Some of the most recent results from Germany and Scandinavia indicate that with careful patient selection and modification of technique the success rate can be raised from 50% to 75%.

Clearly the implantable magnetic continent colostomy device is not a panacea that is about to solve all the problems of colostomy management for patients having to have their rectum removed. It is suitable only for mentally and physically active patients who are not too fat and who have a good prognosis after abdominoperineal resection of the rectum. Attention to technical detail and the prevention of infection is essential. Details of technique and an instructional film have been prepared by some of us and are available from Coloplast International. Most surgeons must expect that in their early experience with this device there will be some difficulties and much less than total patient satisfaction. Nevertheless, the gratitude

of the patients successfully managing their colostomy by this method encourages us to use it in selected patients, particularly as the consequences of failure appear to be small. The morbidity of the removal of the ring is small, and most of the patients not using the magnetic device still keep their ring in situ without any disadvantages. We believe that the lessons learned from our collective early experience will permit us and others to be able to offer this technique to three out of four patients.

What has not yet been decided is how the use of the magnetic device compares with other methods of colostomy management, for there are many patients with a regular predictable colostomy action who have so little trouble with conventional management that they would not wish for anything else. There are many patients successfully managing a colostomy lavage technique once every 24 to 48 hours who need to wear nothing apart from the smallest of dressings over their stoma.

Once the magnetic device can be made to work in a reasonably high proportion of patients, surgeons have to decide for which group of patients it is the best form of management; then to decide whether it is possible to predict this group of patients before operation or whether they should usually first have a conventional colostomy and be offered the magnetic device as a secondary implantation if they need or wish it.

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References

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Today's Treatment

Diseases of the urinary system

Advances in the treatment of kidney diseases : An introduction

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Considerable advances have been made in treating kidney diseases since 1960. Undoubtedly the most dramatic has been maintenance haemodialysis and renal transplantation for terminal irreversible renal failure. Not only can many patients now be treated who would otherwise die from uraemia but, in addition, these treatments have added tremendous impetus to

research into the nature of the biochemical and hormonal abnormalities that occur in chronic renal failure, basic renal physiology, and also the nature of the underlying renal diseases that may result in terminal renal failure—principally the various forms of glomerulonephritis.

I want to give a brief introduction to the present state of maintenance haemodialysis and renal transplantation and also to mention a few of the areas of renal pathophysiology where advances have and are being made. Some of these areas will be explored in greater detail in future articles in this series.

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Maintenance haemodialysis and renal transplantation

Haemodialysis was introduced by Kolff in the management of acute renal failure in 1943. Its use was limited to this until 1960