CASE REPORT

Gracilis Muscle as Neoanal Sphincter for Faecal Incontinence

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SUMMARY

Faecal incontinence is a debilitating chronic clinical condition which may affect the patient and care givers. Modality of treatment is based on severity of the symptoms as well as the anatomical defect itself, availability of resources and expertise. We describe a modified technique of dynamic graciloplasty as neoanal sphincter for the treatment severe faecal incontinence who has failed previous over lapping sphincteroplasty. In our modified version, instead of using implanted intramuscular electrodes and subcutaneous neurostimulator to provide continuous stimulation, the patient will undergo an external stimulation on the nerve of transplanted gracilis periodically and concurrent biofeedback therapy. We believe the technique is relatively easy to learn and very cost effective without any electrodes or neurostimulator related complications.

KEY WORDS:
Faecal incontinence, Gracilis neoanal sphincter, Graciloplasty

INTRODUCTION

Faecal incontinence is a debilitating clinical disability that affects patients' quality of life. It leads to social withdrawal, loss of social independence and reduced self esteem. The management of the condition depends on severity of the symptoms, residual anorectal physiological function and anatomy, expertise and financial resources. Patients with minor symptoms can be treated non-surgically with dietary modification, biofeedback or anti-diarrhoeal medication[1].

On the other hand, surgical repair is reserved for patients with severe symptoms and/or with definite anatomical defect. Gracilis neo-anal sphincter, artificial bowel sphincter or sacral nerve stimulation are the treatment of choice[1]. However these techniques are very costly in particular for patients from Asian countries. A standard gracilis neo-anal sphincter reconstruction needs implanted intramuscular electrodes (model SP 5566, Medtronic, Kerkrade, the Netherlands) and connected through a subcutaneous tunnel to the neurostimulator (Itrel II, model 7424, Medtronic, Kerkrade, the Netherlands) which is placed in the abdominal wall to stimulate the transposed gracilis muscle to function as an anal sphincter[2]. In our modified technique, instead of using implanted electrodes and neurostimulator generator, the gracilis neosphincter will be externally stimulated by using a low frequency nerve stimulator and, at the same time, the patients undergo a course of biofeedback training session. We would like to report a patient who underwent this modified technique in our centre for severe faecal incontinence.

CASE REPORT

A 35-year old man was referred to our centre with severe faecal incontinence after a road traffic accident in late 2002. In the accident, he had sustained a deep perineal injury with transected urethra, degloving injury of the testis, diathesis of symphysis pubis and closed inter-trochanteric fracture of the left femur. He underwent an emergency fixation of the left femur, debridement of the perineal wound, urethral repair and defunctioning colostomy. Few months after the first surgery, he underwent two overlapping anal sphincteroplasty procedures which did not show a good functional outcome. He was later referred to our centre for further evaluation and management.

Our initial clinical assessment revealed that he was a well built man with abnormal gait and left sided diversion colostomy in situ. Perineal examination revealed severe anorectal deformity with scarring from previous surgery around the anal opening. Digital rectal examination revealed minimal anal tone. His Cleveland Clinic Florida (Wexner) continence score was 16(total continence=0, total incontinence=20). The pelvic magnetic resonance imaging (MRI) showed fibrosis around the pelvic floor muscle and poor delineation of the anatomy of the anal sphincter. Endoanal ultrasonography showed absence of more than 50% of the anal sphincter. Anal manometry examinations also demonstrated very low anal resting and squeeze pressures (Figure 1). Due to his significant anatomical and functional impairments, we decided to proceed with a gracilis muscle transposition as a neo-anal sphincter.

Operative technique

Patient was placed in a modified Lloyd–Davies position with the urinary bladder catheterized. Prophylactic antibiotics consisted of 1.2 grams of co-amoxyclavulinic acid, gentamicin 80-120 milligrams and metronidazole 500 milligrams administered intravenously. The right gracilis muscle was mobilized on its proximal neurovascluar pedicle via three short incisions (two in the thigh, one over the tibial tuberosity). The nerve to the gracilis was identified by use of a nerve stimulator. The muscle was then transposed in alpha configuration into a circum-anal tunnel and its tendon secured to the right ischial tuberosity with non-absorbable suture. The incisions were approximated with 2/0 Polyglactin 910 sutures.

This article was accepted: 7 January 2010
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Table I : Anal manometry study of our patient before and after gracilis neo-anal sphincter to show a significant difference in terms of anal sphincter function during resting and squeeze pressure

Distance from anal verge (cm)	Pre-Operative		Post-Operative	
	Rest(mmHg)	Squeeze(mmHg)	Rest(mmHg)	Squeeze(mmHg)
1	2.7	19.5	70.0	120.0
2	1.5	22.6	130.0	160.0
3	0.4	29.3	50.0	170.0
4	4.7	39.1	60.0	110.0

Two weeks after surgery, he underwent low frequency external stimulation of the transplanted gracilis, at the point of entry of nerve into the muscle, using a surface electrode at our physiotherapy department as well as biofeedback exercise programme for about 12 weeks. At four months after the surgery, he was reviewed at our outpatient clinic to assess his functional outcome which includes continence score, anal manometry and endoanal ultrasonography. His continence score was 0 and endoanal ultrasonography showed a good muscular structure around the anal canal which represent the gracilis muscle and anal manometry result was within a normal range (Table I). He underwent closure of his colostomy five months after the gracilis transposition.

DISCUSSION

The use of gracilis as a neoanal sphincter has been described since early 1950's but the outcome had been unfavourable due to the fatigability nature of the muscle itself. However later on, few literatures have recorded that this Type II muscle can be transformed into a non-fatigue Type I muscle by regular electrical nerve stimulation[2]. Consequently in the late 1980's, Baeten *et al* reported the use of implanted electrodes and a mini neurostimulator generator in the patient who underwent gracilis neo-sphincter construction with considerable success[3]. Since then several studies have shown significant improvement in the outcomes which correlate with improvement in the technology of the electrodes.

In most Asian countries, where resources are limited and there are financial constraints, insertion of stimulating electrodes is not cost effective. The conventional dynamic graciloplasty utilizes implanted intramuscular electrodes and neurostimulator cost more than USD10,000 for a single patient and require delicate after-sales service support which is not available in most Asian countries[4]. Niriella *et al* have demonstrated that external stimulation of transposed gracilis muscle at the point of nerve entry into the muscle and concomitant biofeedback exercise have produced an equivalent functional outcome as compared to a standard gracilis neosphincter[5]. Observation in our patient revealed that the functional outcome after this modified technique is almost equivalent to the native anal sphincter function without any major complication.

Previous studies have reported few complications after the conventional gracilis neoanal sphincter such as perineal wound dehiscence, electrodes related infection, difficulty in evacuation and temporary thigh pain[2,3]. However our patient did not experience any of these post-operative morbidities after being discharged.

We believe that this technique is very convenient and cost effective for patients with severe faecal incontinence who cannot afford to buy the device in particular but which is relatively easy to learn.

ACKNOWLEDGEMENT

I wish to thank Professor Kemal I Deen for reviewing the manuscript and teaching me the technique.

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