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Bulking Agents and Faecal Incontinence.

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Summary

Introduction: Faecal Incontinence is a PHYSICALLY AND PSYCHOLOGICALLY DEBILITATING SYMPTOM WHICH HAS A SERIOUS IMPACT ON public health. Until now, treatment of mild to moderate FORMS HAS BEEN BASED on medical, nutritional, and rehabilitative therapy, with a success rate of less than 65%. A recent innovation in the treatment of mild to moderate faecal incontinence HAS BEEN the introduction of injectable agents.

Methods: A total of 34 (26 female and 8 males) patients were selected for AN implantation OF BULKING AGENTS and THEY all underwent the following examinations:

1) Anorectal manometry: before treatment and at 90 days
2) Anorectal ultrasound: before treatment and at 90 days
3) A clinical evaluation: at days 7, 30, and 90
4) Wexner score and FIQL: before treatment and at 90 days

Results: As a preliminary evaluation with a 12 month follow-up we have observed a mean Wexner score VARYING from 7.05 to 1,26, and a mean improvement >20 mmHg in THE postoperative basal value OF MANOMETRY:

Conclusion: the straightforwardness of the procedure, the ease of use of the product, the tolerable procedure and its repeatability make B.A. FIRST-LINE PRODUCTS IN THE treatment of mild to moderate FI. Furthermore no particular intolerance as well as major complications have been encountered SO FAR.

Introduction

The internal anal sphincter (IAS) provides most of the resting anal pressure (1,2) and is the main muscle responsible for the prevention of anal leakage. Degeneration or disruption of the IAS characteristically leads to fecal incontinence or soiling. Degeneration can be primary (3), or secondary to primary systemic sclerosis (4) Structural damage may result from childbirth trauma, surgical trauma such as sphincterotomy or fistula surgery, or other accidental trauma.
Faecal Incontinence (FI) is a SYMTOM with a SEVERE IMPACT ON public health (5). It is physically and psychologically debilitating and may LEAD the patient TO progressive isolation and loss of all social, family, and work-related activities (6).
The incidence of FI in the adult population is between 0.5% and 18.4%, percentages that increase to 32% in the geriatric population and to 56% in elderly patients with psychiatric disorders. Furthermore, in women (7) in the 45-year age range, the incidence of FI is 9 times higher than in men of the same age range.
In any event, FI is an underestimated SYMTOM firstly due to patient embarrassment and reluctance to reveal it to their physician, and secondly ONCE REVEALED, THERE IS limited consideration ON BEHALF OF THE PHYSICIAN.

The Traditional Approach to F.I.

Usually it's necessary TO SCORE FI by testing the patient before OFFERING a RECOMMENDED THERAPY (tab 1)

Type of incontinence	Never	Rarely	Sometimes	Usually	Always
Solid	0	1	2	3	4
Liquid	0	1	2	3	4
Gas	0	1	2	3	4
Wears pad	0	1	2	3	4
Lifestyle alteration	0	1	2	3	4
rarely : <1/month sometimes : <1/week, 1/month usually : <1/day, 1/week alwaYs : 1/day					
0 : perfect, 20 : complete incontinence					

Tab.1: Wexner Evaluation Test of FI.

While anti-diarrheal drugs such as loperamide or codeine phosphate help some patients, THEY ARE not a satisfactory long-term solution for most patients.
In recent years, in support of traditional treatment of FI, rehabilitative methods (8) have been tested and implemented. These were initially used when surgery failed and WAS considered palliative . Subsequently, they were also used as first-line treatment, together with pharmaceutical MEANS and nutrition , for mild to moderate FI.
Furthermore, based on sound experience from numerous studies, rehabilitative methods are also being used for treatment of severe FI in the preoperative stage.
In severe FI, the only SUCCESSFUL FORM, in most cases, and only in the short to medium term, is surgery (9) (tab.2)

- The "Overlapping Sphincteroplasty" represent the "gold standard" surgical procedure in case of external sphincter fracture
- Alternative surgical therapy :

Injective Bulking Agents Percutaneous Tibial Nerve Stimulation Sacral Neuromodulation	→	MODERATE INCONTINENCE
Stimulated Gracileplastic Artificial Anal Sphincter Antegrade Continent Enema	→	ONLY FOR SEVERE INCONTINENCE

Tab 2: Surgical options for treatment of fecal incontinence.

The internal sphincter is not easily amenable to surgical repair (10) as it is extremely thin (approximately 2-3 mm) and, as a circular muscle, is under tension.
Complex operations such as the Dynamic Graciloplasty or the Artificial Anal Sphincter provide an elevation in resting pressure. These operations are most appropriate in cases of major sphincter disruption requiring considerable expertise to achieve a good result, and are associated with a relatively high RATE OF complicationS (11,12,13,14). A further possible therapy for patients with internal sphincter dysfunction may be Sacral Nerve Stimulation, however this procedure is still experimental (15,16,17) and the indications for its use HAVE BEEN described in some recent studies (18,19).

Injectable Bulking Agents (Ba) and F.I.

An alternative approach may be to either fill the asymmetric anal canal defect using a skin flap or to directly augment the internal sphincter muscle. Insertion of a skin flap into the area of a defect improved 13 of 14 patients in the only report of this procedure. Augmentation of the muscle bulk could be undertaken at sites where it is deficient or circumferentially if the whole muscle HAS degenerateD. This has been performed in four uncontrolled studies, all with short-term follow-up (20,21,22,23):

- In the first, autologous fat was injected at 2 sites in 14 patients. Up to 3 injections were required, but continence improved in all.
- The second report is of a single case that required 2 injections of autologous fat to regain continence following a failed repair of an obstetric-related defect.
- In the third study, Teflon paste was injected in 11 patients (20). Seven patients were continent after 1 or 2 injections, and the other 4 were improved.
- In the fourth study, Gax collagen injections markedly improved 8 of 11 patients with an IAS defect or IAS weakness.

A recent innovation in the treatment of mild to moderate faecal incontinence is the introduction of injectable agents.

At the moment A GROUP OF INJECTABLE BA are well known BECAUSE THEY HAVE BEEN USED IN in urinary incontinence:

1) COAPTITE®
2) DURASPHERE®
3) SOLESTA®
4) PTQ®

1) Coaptite®, a normal constituent of bone, has been used TO TREAT women with ISD. Calcium Hydroxylapatite Coaptite® (Bioform Medical 1875 South Grant Street, Suite 110, San Mateo, CA) is an inert substance to inject, avoiding any stimulation of the immune system. The size of the particle limits the possibility of displacement of the material, a natural protein commonly found in animal bones and connective tissue.

2) Carbon bead particles Durasphere® (Carbon Medical Technologies, Inc., St. Paul, Minnesota) are an attractive alternative to currently available injectable agents. Carbon bead particles are non-biodegradable bulking agents that may have similar efficacy with fewer adverse effects compared to bovine collagen. Durasphere® has reported similar outcomes as collagen injections without the problem of early reabsorption. The material may be more difficult to inject than

collagen because of increased viscosity and requires an 18- to 19-gauge needle for the injection. If any resistance to the injection is encountered, such as from scar tissue, the suspension gel tends to be injected first, leaving the carbon bead particles behind in the syringe.

3) Solesta™ (Q-Med AB, Seminariegatan 21, SE-752 28 Uppsala, Sweden) is a sterile, highly viscous gel of destranomer microspheres and stabilized non animal hyaluronic acid constituting a biocompatible and slowly biodegradable implant. The stabilized hyaluronic acid acts mainly as a carrier, leaving the destranomer microspheres at the implant site. They are gradually surrounded by host connective tissue. The implant is expected to be retained in situ for extended periods of time.

4) PTQ® implants are solid, irregularly shaped, textured, medical grade, polydimethylsiloxane elastomer implants suspended in a hydrogel carrier of pharmacopia grade polyvinylpyrrolidone (PVP or povidone) (PTQ™. PTQ Implants - Uroplasty BV, The Netherlands).
Periurethral injection with silicone has been performed for urinary stress incontinence since 1991 (24,25,26). Macroplastique is injected circumferentially at the bladder neck, adding "bulk" to the tissues and increasing urethral resistance to improve urinary continence. Circumferential injection of this material into the submucosa of the anal canal (herein referred to as PTQ™ Implants, or PTQ™) could have a similar "bulking" effect. It has been reported that vascular filling in the anal canal contributes TO about 15-20% of the resting anal canal pressure (27) and the anal cushions act as a "compliant and comfortable plug" at the anal margin (28); it has even been suggested that hemorrhoidal tissue could be a cause of constipation (29).
The local tissue response to vulcanized polydimethylsiloxane based PTQ® is characterized by stable formation of giant cells at the surface of the implant site and the development of a mature, organized fibrous capsule around and through the implant material. There is no evidence in the data from published studies to indicate there is an ongoing acute inflammatory response beyond 4 weeks post-implantation. The cellular response reported becomes quiescent by 2 to 3 months post-implantation. Beyond this period, the primary changes noted involved the further organization of the collagen matrix surrounding the implant site into an organized fibrous capsule. At 3 to 6 months post-implantation, the near absence of neutrophils, active macrophages, or local tissue degradation surrounding the implant indicates there is extremely little, if any, continued immunogenic stimulation with the implanted material. No local tissue reaction or implant site erosion is anticipated after 6 months post-implantation.
A pilot study using PTQ® Implants (previously known as Bioplastique™ Implants) was performed for sphincter augmentation for either diffuse IAS weakness or isolated IAS defects. The pilot study identified, then rectified, initial problems with ulceration and infection by altering the injection technique and the antibiotic protocol. This study showed ongoing benefit in 3 of 10 patients at 6 months follow-up with multiple circumferential injections around the anus rather than a single injection into an isolated defect. In a second pilot study, this adjusted implantation technique was evaluated and proved to be satisfactory; 5 of 6 patients had a marked improvement while both resting and squeezing pressure increased significantly. Additionally, fecal incontinence and QOL scores showed a progress. Our experience aims to assess this modified technique in a larger group and to confirm the initial outcome that circumferential injections are effective for patients with both isolated IAS defects and those with circumferentially intact muscle that exhibit weakness.

Personal Experience

SINCE 2004 we have recruited a large number of patients in order to evaluate the short and medium term results of mild to moderate FI treatment with PTQ®.
34 patients (26 women and 8 men) with mild to moderate faecal incontinence were carefully selected (21 PTQ®, 07 DURASPHERE®, 06 SOLESTA®).
The Durasphere® group is included in the Altomare report (39), and Solesta® group is a part of an International Trial actually in progress.
We performed preoperative anorectal manometry and transanal ultrasound on each patient.
Patients were given a psychiatric evaluation, a Wexner (30) severity of Incontinence test, and a Faecal "quality of life" test (FIQL)(31).
Patients who were not eligible from a psychiatric perspective, those who had other severe diseases, and those who were not motivated to undergo the treatment were excluded from the study.
The PTQ® was implanted under local anesthesia (a minimal volume of 2% xylocaine) in the intersphincteric area (fig. 1) with digital endorectal guidance by means of three equidistant 120° 2.5 ml injections.

In order to objectively evaluate the incontinence data prior to treatment, we analyzed the most pertinent preoperative data: the Wexner score and anal manometry.
The mean preoperative manometric value for the basal pressure was 30,6 mmHg, and the mean preoperative value for the Wexner score was 7,05.
For our protocol, we clinically evaluated the patients in the week before, 7, 30, and 90 days after treatment.

We repeated anal manometry, transanal ultrasound, and reevaluated the Wexner score and the FIQL at 90 days.
The mean manometric value of the basal pressure at 90 days was 50.94 mmHG ($X^{2:}$ p= 0.00), and the mean value of the Wexner score at 90 days was 1.26 (X^2 p=0.00). A final 24 months follow-up substantially CONFIRMED the results.
A post-operative U.S. shows the BA appliance (Fig.4).

Conclusive Consideration

Traditionally, there are three approaches to treat Faecal Incontinence (32):

1. Pharmaceutical and nutritional therapy
2. Surgical therapy
3. Rehabilitative therapy.

Pharmaceutical and nutritional therapy are reserved for mild forms of FI (Wexner score <5); while surgical therapy is aimed at patients with moderate to severe FI (Wexner score >5). On the contrary, rehabilitative therapy is indicated not only for the treatment of mild and/or moderate FI, but also for the treatment of severe FI in cases of pelvic dyskinesia, TO PREPARE for surgery, and MAINTAIN a degree of sphincteral tonicity.
Surgical therapy is performed in sphincteral lesions of obstetric, iatrogenic, traumatic origin, idiopathic and neurogenic FI. The techniques used vary: direct sphincteroplasty, sphincteroplasty with overlapping, postanal repair, graciloplasty, and artificial sphincter implantation.
For mild to moderate incontinence, the results with medical and rehabilitative therapy are less then 70% (33). For the remaining 30%, surgery is indicated, with a long-term success rate under 50%, without considering the risks related to any surgical procedure (34,35).
It has been shown to be a product capable of solving most problematic cases of mild to moderate FI: in 19 patients (55.88%), we obtained an improvement of Wexner score (from >4 to <1), and in 19 patients (55.88%) an improvement >20 mmHg in manometry, at 60 days.
Finally, 95% (32) of patients showed improvement of approximately 20 points in their FIQL Score.
WITH THE EXCEPTION OF some mild infection and migration of the injected material, there aren't significant complications in previous literature (25,26).
Based on these encouraging results, the straightforwardness of the procedure, the minimal invasiveness of the technique and the absence of surgical complications, we feel that PTQ® is an advancement for treatment of mild to moderate FI, characterized not only by its intrinsic simplicity, but also by the invaluable opportunity of being able to perform the procedure TO IMPROVE continence at various stages, the possibility of combining it with other treatment modalities, or considering it as potential first-line treatment for moderate to severe incontinence (Fig. 3).
BECAUSE THESE previous considerations ARE related to our preliminary experience and in the longer (3 years) follow-up LEAD TO a confirmation of our result with just more THAN 3 cases retreated with success AND BECAUSE OF a possibility of MORE treatment, we suggest THAT bulking agents BE a first line treatment in case of mild or moderate degree FI not amenable TO conservative or rehabilitative therapy.

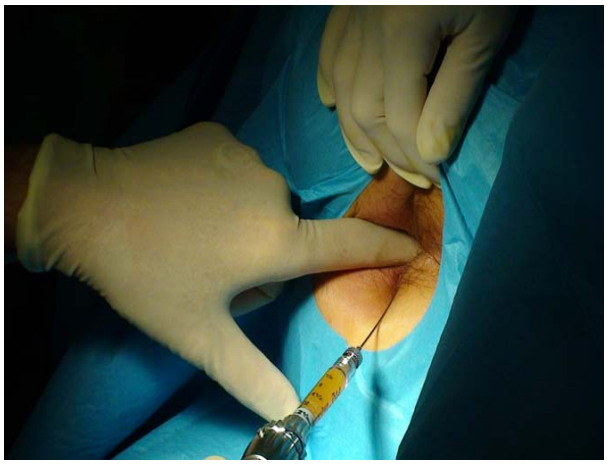

Fig 1. Injection of Bulking agent (PTQ®) under finger guidance.

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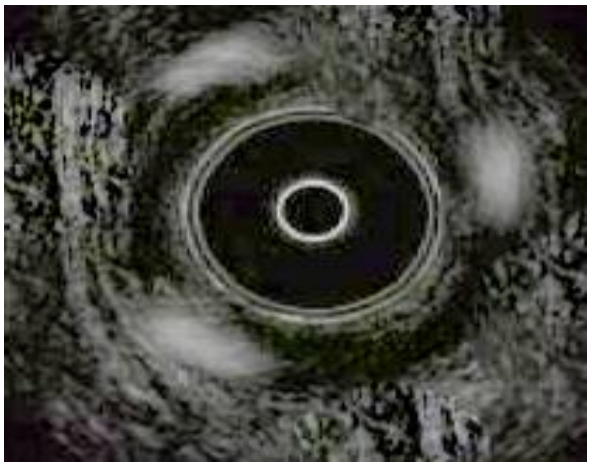

Fig 2. The post operative ultrasound at 30 days

Authors	Bulking agent	Patients n°	Mean Follow up month	Grade of Fecal incontinence	
				Preop.	Postop.
GANIO et Al (36)	COAPTITE®	10	12	FISS 85,6	FISS 28,0
TJANDRA et Al. (37)	PTQ®	I° 42 II° 40	12	CCCS 14,5 CCCS 14,5	CCCS 03 CCCS 11
BAETEN et Al. (38)	PTQ®	24	12	VAIZEY(16) 4,2	VAIZEY(16) 2,1
LA TORRE	PTQ®	21	24	CCCS 07	CCCS 01
ALTOMARE et Al. (39)	DURASPHERE®	33	20,8	CCCS 12	CCCS 08
LA TORRE	SOLESTA® *	06	3	CCCS 08	CCCS 03

Tab 3: A Review of main bibliography on the use of Bulking Agents in fecal incontinence.

CCCS: Cleveland clinic continence score.
FISS: Fecal Incontinence Scoring System.

** European Experimental Trial in progress*.

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