Circumferential Rectal Myotomy (CRM) for Reflex Anal Incontinence: A New Operation for a New Disease.

Ahmed Farag Ahmed Farag.
Head of the Colorectal Unit – Kasr Al-Ainy Hospital.
Cairo University.

- Fecal Incontinence May be multi-factorial due to altered stool consistency, increased rate of delivery of contents to the rectum, abnormal rectal capacity and compliance, decreased AR sensations and pelvic floor or anal sphincter dysfunction.

(Jorge and Wexner: Dis Colon Rectum 1993)

(N.B.They didn't mentioned Reflexes).

Using traditional research methodology, the reported data had been described as being *disseminated research data* by some authors and by the others as being adding to the *confusion* experienced in the world of Anal Incontinence.

(Varma et al Dis colon Rectum 1999 – editors comment)

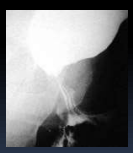
The flow equation had been used successfully previously in medicine in order to understand and study:

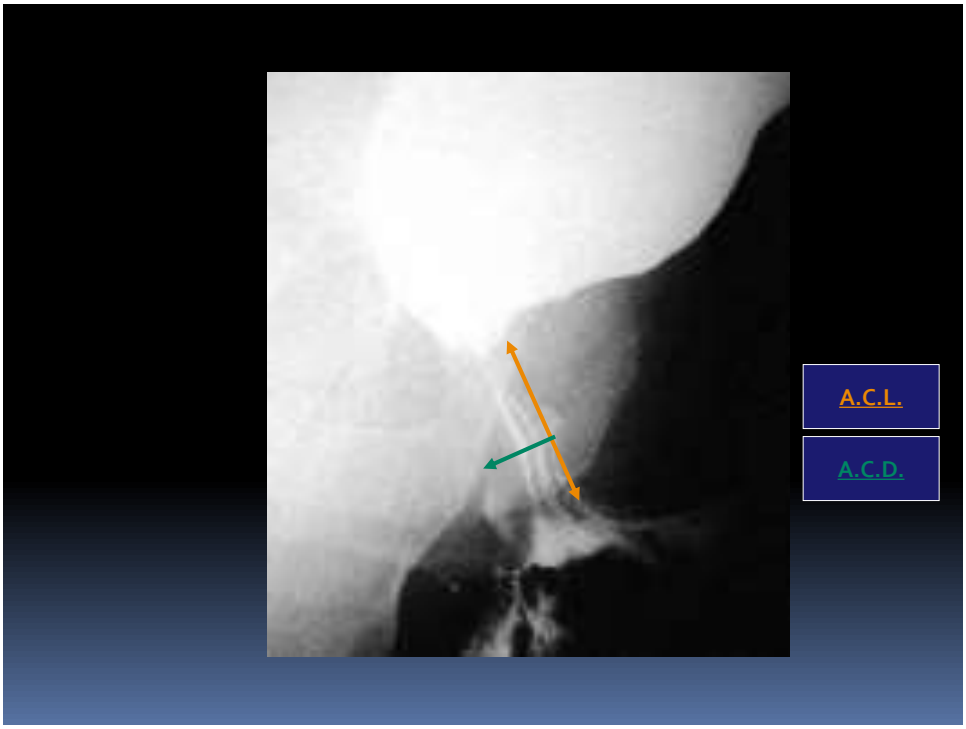
1. Urodynamics.
2. Hemodynamics.

1. Passive. (Engel et al 1995).
2. Urgency. (Engel et al 1995).
3. Stress. (Swash 1990).

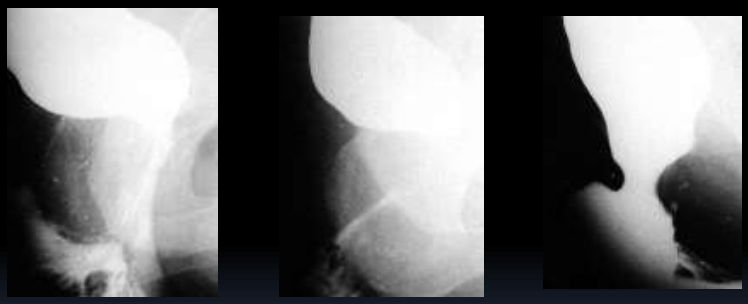
The Flow Equation

$$\text{Flow } (A.I.) = \frac{\textit{intrarectal}\ \text{Pressure}}{\textit{Anal canal}\ \text{Resistance}}$$





Structure – Function relationship



Rest | Sq. (X8) | Strain (/88)

Primary Mechanical Factors

$$\text{Flow (A.I.)} = \text{intrarectal Pressure} \times \frac{3.14 \times (\text{A.C. Diameter})^4}{128 \times \text{D.V.} \times \text{A.C. Length}}$$

Dynamic Viscosity of Air:Water:Barium sulphate paste =
1 : 38 : 68

Sensory & Reflex Factors

Flow *(A.I.)* = *intrarectal* Pressure / *Anal canal* Resistance

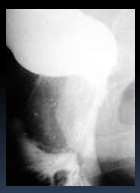
Sensory

Reflexes

Passive A.I.

(Mechanical Factors)

$$\text{Flow (A.I.)} = \frac{\text{IRP (rest)}}{\text{A.C. Resistance (rest)}}$$

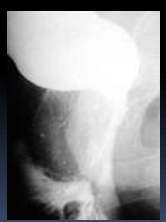


Passive A.I.

(Sensory Deficit)

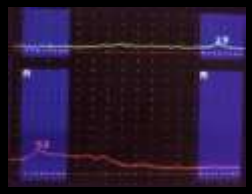
$$\text{Flow (A.I.)} = \frac{\text{IRP (rest)}}{\text{A.C. Resistance (rest)}}$$

Sensory Factors

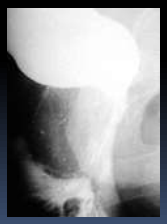


Passive A.I.

(Reflex Factors)



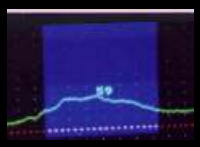
Flow (A.I.)= ----------



Reflex Deficit

Urgency A.I.

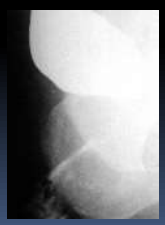
(Mechanical Factors)



IRP (urgency)

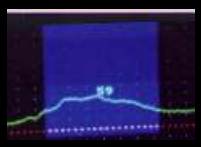
Flow (A.I.) = ----------

A.C. resistance (sq.)



Urgency A.I.

(Sensory and reflex Factors)



IRP (urgency)

Flow (A.I.)= ----------

A.C. Resistance (Strain.)

Farag A. Eur. Surg. Res. 1998

Types of A.I.

1. Mechanical.
2. Sensory.
3. Reflex. (described but never Characterized)

Review of Literature.

Abnormal RAIR as a cause of anal incontinence in the absence of any mechanical or sensory damage had been observed by many authors but never described as a separate disease entity.

- Sangwan YP, Coller JA, Schoetz DJ Jr, Roberts PL, Murray JJ. Spectrum of abnormal rectoanal reflex patterns in patients with fecal incontinence. Dis Colon Rectum 1996;39:59–65; DOI: 10.1007/BF02048271
- Kaur G, Gardiner A, Duthie GS; Rectoanal reflex parameters in incontinence and constipation; Dis Colon Rectum. 2002 Jul;45(7):928-33; PMID: 12130882

Review of Literature.

Zbar et al[3], stated that no posthemorrhoid-ectomy case among their 9 patients included in their study had evidence of sphincter damage. They described a reduction in area under curve (AUC) in those patients which described by Speakman and Kamm as a profound RAIR.

- Zbar AP, Beer-Gabel M, Chiappa AC, Aslam M. Fecal incontinence after minor anorectal surgery. Dis Colon Rectum. 2001 Nov;44(11):1610-9. Discussion 1619-23. PMID: 11711732
- Speakman CT, Kamm MA; The internal and sphincter--new insights into faecal incontinence; Gut. 1991 Apr;32(4):345-6; PMID: 2026330

Review of Literature.

Similarly Garrett and Howard concluded that in many cases of idiopathic fecal incontinence, there is inappropriate sphincter relaxation which may contribute to this leakage while others stated that the inhibitory responses due to reflex relaxation of the internal anal sphincter may override motor responses as a cause of leakage and incontinence.

Garrett JR, Howard ER; Myenteric plexus of the hind-gut: developmental abnormalities in humans and experimental studies; Ciba Found Symp. 1981;83:326-54; PMID: 6913488.

Presentation of A case.

Presentation of A case.

- A 40-year-old male patient presented with complete anal incontinence after hemorroidectomy operation 12 years before presenting to us.

Presentation of A case.

- A sphincter repair was done after 4 years of his hemorroidectomy operation, but was unsuccessful. This was followed by failed trial of Bulking agent after one year.

Presentation of A case.

- On presentation, the patient had complete urge incontinence with score of 20 on Jorge/Wexner Continence Grading Scale. Anorectal manometric findings revealed an acceptable resting anal pressure, with weak squeeze pressure, very sensitive rectum (20, 50 & 60 ml for first, constant and urge sensation) & low rectal compliance (2ml/mmHg at the point of urge was observed).

Presentation of A case.

- There was a profound relaxation of the anal sphincter during urge sensation with leakage of water observed at this point.

- Intactness of anal sphincter was confirmed by phased array MRI of the anal canal. Sigmoidoscopy, with blind mucosal biopsy, revealed no organic abnormality to explain the patient's rectal hyperreflexia.


- According to the literature sacral nerve modulation (SNM) was originally indicated in the presence of intact anal sphincters with hypersensitivity of the rectum.


- The technique of circumferential rectal myotomy was described by Lubowski et al[6], during their study of the transmural pathway of RAIR.

- In the present case, the patient could not afford for the cost of the S.N.M. and the operation of circumferential rectal myotomy was explained to the patient and approval of the ethical committee in our hospital was obtained as well as informed consent from the patient.

AntiCholinergics

- In the present case, the patient could not afford for the cost of the S.N.M. and the patient was characterized as a case of Reflex Anal Incontinence and managed conservatively using Anticholinergics "Buscopan 5 mg twice /day), which was successful in controlling the patient's symptoms for a month where he started to suffer from Dry mouth and blurring of vision.

Transverse Rectal Myotomy

- In the present case, the patient could not afford for the cost of the S.N.M. and the operation of circumferential rectal myotomy was explained to the patient and approval of the ethical committee in our hospital was obtained as well as informed consent from the patient.

Transverse Rectal Myotomy

- The patient had routine colonic preparation. With midline sub-umblical incision, mobilization of rectum in extra-fascial plain was done, with mobilization (without division) of middle rectal vessels, below the end of mesorectum.

Transverse Rectal Myotomy

- The rectal wall was infiltrated with adrenaline 1/200,000cc in saline circumferentially. Scissor cut was done under vision in order to achieve circumferential rectal myotomy down to sub-mucosa.

Transverse Rectal Myotomy

- Intactness of mucosa & sub-mucosa was tested using air inflation test followed by diluted methylene blue infusion test. Abdomen was closed without drains.

Results

- The patient had his first bowel movement after 48 hours with full continence. There was marked drop of the continence score from 20 to 0 during the first month postoperatively, then to 2 after one year up to 5 years postoperatively.

Results

- Follow-up manometry was done after one year of the operation. There was no change in resting pressure but there was marked change in the squeeze pressure (from 80 to 120 mmHg).

Results

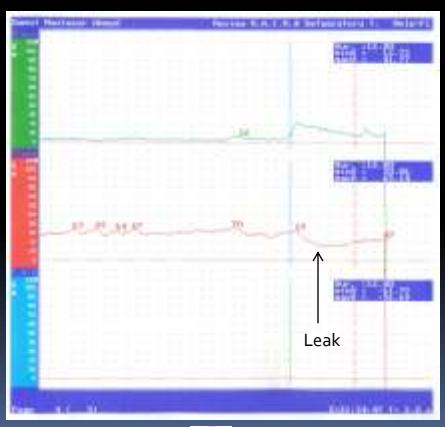
- Improved Rectal sensations (from 20, 50 , 60 to 50, 150, 200) for the first, constant and urge sensation with no leakage of water during sense of urge postoperatively.

Results

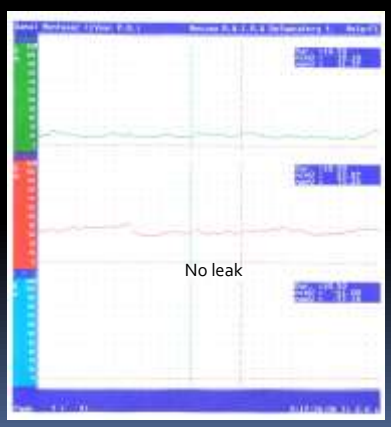
- A marked increase in AUC from 480 (preoperative) to 698 (postoperative).

RESULTS

Preop. Anorectal manometry with rectal (upper graph) & anal (lower graph) channels showing RAIR (between cursors) during urgency with rectal volume of 60 ml before the operation



Post op. Anorectal manometry with rectal (upper graph) & anal (lower graph) channels showing RAIR (between cursors) during urgency with rectal volume of 200 ml one year after operation.



Results

	Pre-operative	1-year postoperative
Maximal resting pressure	74	80
Maximal squeeze pressure	79	95
Vector volume (resting)	2198	1815
Vector volume (squeeze)	2824	3871
1st sensation	15	50
Constant sensations	35	160
1st urge	60	200
Rectal pressure in urgency	41	24
Max anal pressure in coughing	74	118
Compliance	2 ml/mmHg	7 ml/ mmHg

Results

		Pre-operative	1-year postoperative
Rectal volume		60 ml	200 ml
Duration		12.00	10.5
% Relaxation (anal channel)		41.13%	3.24 %
AUC (anal channel)		480.39	698
Slope (anal channel)		- 1.72 / sec	- 0.11/ sec
Mean pressure	Rectal	26.98	23.62
	Anal	40.45	66.5
Max pressure	Rectal	41.77	31.37
	Anal	65.14	73,2
Min pressure	Rectal	12.73	18.10
	Anal	30.06	63.87

Transverse Rectal Myotomy

- A marked improvement of rectal compliance from 2 ml/mmHg (preoperative) to 7 ml/mmHg (postoperative).

Complications

- No reported post-operative complications apart from patient's complain of sense of difficult evacuation of stools. It was relieved by the use of glycerin trinitrate (GTN) ointment 2% for first 6 month, applied to the perianal skin 15 minutes before defecation for one year.

Discussion

- Permanent abolishment of the profound RAIR can be suggested as the cause of improvement of sphincter function postoperatively.

Discussion

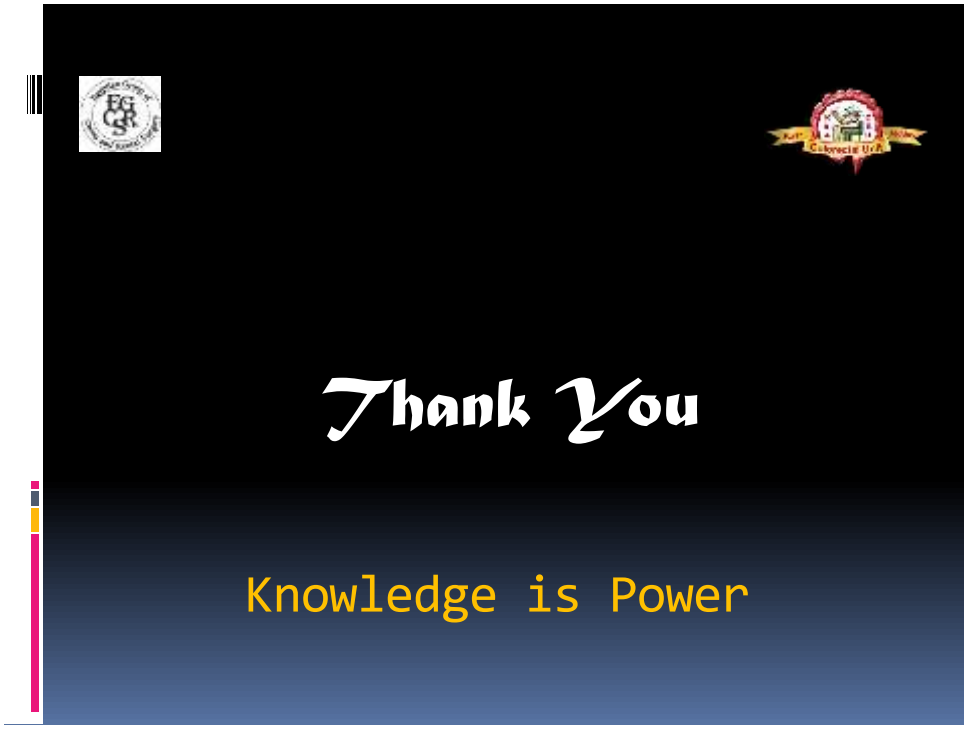
- Improvement in rectal function after operation in our case can suggest presence of new reflex anorectal arc , which works as feedback from anal canal to rectum. The presence and full characterization of such reflex is under study in our center.

Conclusion

- Reflex A.I. had been characterized for first time in this technical note with increased rectal sensitivity, poor compliance with intact anal sphincters & abnormal rectoanal reflex.

Conclusion

- Those changes reported by other authors but never characterized as a separate disease entity, justify to be included under the heading of reflex A.I., that can be treated by anticholinergics or circumferential rectal myotomy as an alternative to expensive sacral nerve stimulation.


Thank You
Knowledge is Power