



University of Michigan
Health System

Effects of Age and Gender on Anorectal Findings in Chronic Constipation

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Background

- Differences exist in anorectal function and anatomy between genders.
- Changes in anorectal function and anatomy occur with aging.
- Anorectal Manometry (ARM) is a non-invasive method used to assess anorectal physiology.
- The effects of age and gender on ARM parameters in constipation is largely unknown

Aims

- Assess anorectal function and sensation in constipated individuals
- Stratify ARM pressure and sensation parameters by age and gender

Methods

- Retrospective chart review of all ARM and Balloon Expulsion Studies (BET) performed at the University of Michigan GI-Physiology Laboratory from 2002-2007
 - 99% of studies performed by the same technician
 - 97% of studies interpreted by the same physician
- ARM :
 - Software: Sandhill Scientific Insight
 - Equipment: Mk II Manometric Perfusion Pump (Dentsleeve Proprietary Ltd.)
 - Probe: Four-channel water- perfused catheter (Mui Scientific)

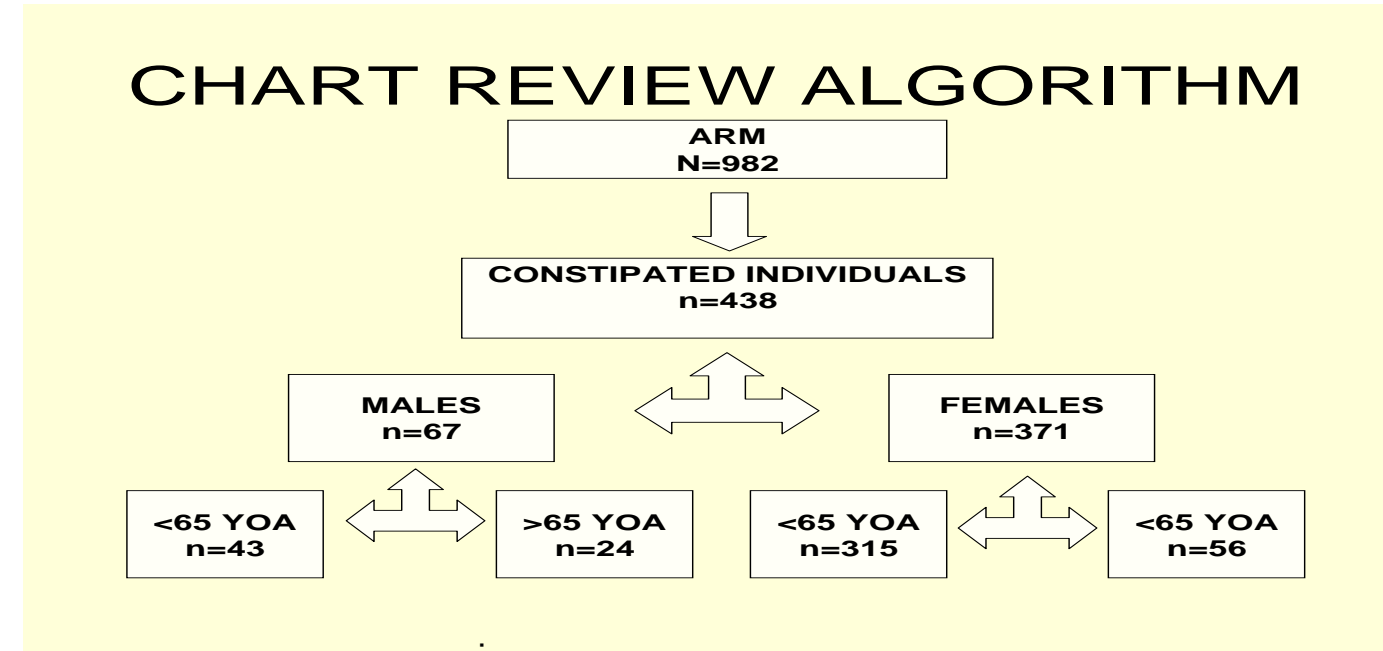


ARM Hardware Cart



ARM catheter

Analysis



Statistical Analysis

- Comparisons of normally distributed variables were made using t-test.
- Comparisons of categorical data was made using chi-square

Results

ARM parameters in Females with Constipation

	Age < 65 YOA	Age ≥ 65 YOA	p-value
HPZ Length (cm): mean +/- s.d.	3.9 +/- 0.6 (n=194)	3.4 +/- 0.7 (n=35)	0.0004
Resting Pressure: mean +/- s.d.	80.5 +/- 31.9 (n=315)	66.1 +/- 27.5 (n=56)	0.0017
Maximum Squeeze: mean +/- s.d.	126.5 +/- 47.3 (n=314)	118.1 +/- 53.9 (n=55)	0.23
Threshold Sensation: mean +/- s.d.	51.7 +/- 38.5 (n=310)	52.8 +/- 33.5 (n=55)	0.84
Urge Pressure: mean +/- s.d.	107.0 +/- 51.2 (n=300)	101.5 +/- 51.4 (n=55)	0.46
Maximum Tolerated: mean +/- s.d.	163.8 +/- 60.4 (n=287)	149.6 +/- 57.5 (n=53)	0.11

ARM parameters in Males with Constipation

	Age < 65 YOA	Age ≥ 65 YOA	p-value
HPZ Length (cm): mean +/- s.d. (n)	4.3 +/- 0.7 (n=28)	3.9 +/- 0.9 (n=8)	0.22
Resting Pressure: mean +/- s.d. (n)	105.8 +/- 50.7 (n=43)	86.7 +/- 38.3 (n=24)	0.11
Maximum Squeeze: mean +/- s.d. (n)	191.7 +/- 80.9 (n=43)	155.4 +/- 38.4 (n=24)	0.02
Threshold Sensation: mean +/- s.d. (n)	61.9 +/- 59.1 (n=42)	67.5 +/- 54.6 (n=24)	0.70
Urge Pressure: mean +/- s.d. (n)	110.8 +/- 61.8 (n=38)	117.8 +/- 48.1 (n=23)	0.65
Maximum Tolerated: mean +/- s.d. (n)	180.5 +/- 67.7 (n=38)	187.5 +/- 66.0 (n=20)	0.71

HPZ = High pressure Zone, S.D. = Standard Deviation, all pressure values are in mm Hg (mm of mercury)

Results

ARM parameters in Young Adults (Age < 65) with Constipation

	WOMEN	MEN	p-value
HPZ Length: mean +/- s.d. (n)	3.9 +/- 0.6 (n=194)	4.3 +/- 0.7 (n=28)	0.0021
Resting Pressure: mean +/- s.d. (n)	80.5 +/- 31.9 (n=315)	105.8 +/- 50.7 (n=43)	0.0026
Maximum Squeeze: mean +/- s.d. (n)	126.5 +/- 47.3 (n=314)	191.7 +/- 80.9 (n=43)	<0.0001
Threshold Sensation: mean +/- s.d. (n)	51.7 +/- 38.5 (n=310)	61.9 +/- 59.1 (n=42)	0.2824
Urge Pressure: mean +/- s.d. (n)	107.0 +/- 51.2 (n=300)	110.8 +/- 61.8 (n=38)	0.6682
Maximum Tolerated: mean +/- s.d. (n)	163.8 +/- 60.4 (n=287)	180.5 +/- 67.7 (n=38)	0.1157

HPZ = High pressure Zone, S.D. = Standard Deviation, all pressure values are in mm Hg (mm of mercury)

ARM parameters in Elderly Adults (Age > 65) with Constipation

	WOMEN	MEN	p-value
HPZ Length (cm): mean +/- s.d. (n)	3.4 +/- 0.7 (n=35)	3.9 +/- 0.9 (n=8)	0.1099
Resting Pressure: mean +/- s.d. (n)	66.1 +/- 27.5 (n=56)	86.7 +/- 38.3 (n=24)	0.0232
Maximum Squeeze: mean +/- s.d. (n)	118.1 +/- 53.9 (n=55)	155.4 +/- 38.4 (n=24)	0.0030
Threshold Sensation: mean +/- s.d. (n)	52.8 +/- 33.5 (n=55)	67.5 +/- 54.6 (n=24)	0.2311
Urge Pressure: mean +/- s.d. (n)	101.5 +/- 51.4 (n=55)	117.8 +/- 48.1 (n=23)	0.1957
Maximum Tolerated: mean +/- s.d. (n)	149.6 +/- 57.5 (n=53)	187.5 +/- 66.0 (n=20)	0.0186

HPZ = High pressure Zone, S.D. = Standard Deviation, all pressure values are in mm Hg (mm of mercury)

Summary

Effects of age on ARM parameters in constipation

- There is a significant decrease in anal sphincter size and resting tone in elderly women compared to younger women
- There is a significant decrease in maximal sphincter strength in elderly men compared with younger men
- No age-related differences in rectal sensation for men or women

Effects of gender on ARM parameters in constipation

- Anal sphincter size and strength is significantly less in young women compared to young men
- This gender-based difference in sphincter size decreases in the elderly population
- No gender-based difference in rectal sensation of young adults
- Elderly women demonstrate a lower maximal tolerated pressure compared to elderly men

Limitation

- Retrospective chart review with a heterogeneous cohort of constipated adults

Conclusions

- The gender-based differences in anal sphincter parameters and rectal sensation assessed by ARM suggest differing gender-based pathophysiologic mechanisms underlie constipation
- The age-based differences in anal sphincter parameters and rectal sensation assessed by ARM suggest differing age-based pathophysiologic mechanisms underlie constipation
- Age-based ARM baseline parameters are needed in addition to current gender-based parameters

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