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Evaluation of Rectal Compliance amongst Individuals with Hemorrhoids with or without Fissure and its Comparison with Healthy Individuals

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Abstract

Background: A physiological basis of the ailments like hemorrhoids and fissure is necessary for symptom specific treatment of patients. We aimed to evaluate rectal compliance and resting anal pressure by anal manometry as an objective parameter to the disease in these patients and compare them with controls.

Material and Methods: Study conducted in 150 patients, after informed consent and IRB approval,in institutional setup, divided into 3 groups. Group 1-patients with Hemorrhoids and fissure in ano (H+F), group 2-Hemorrhoids without fissure (H-F) and group 3-controls without any anorectal pathology. All patients underwent anorectal manometry, results evaluated, noted, and compared between all the three groups. Rectal compliance and resting anal pressure calculated and compared, and its significance evaluated using statistical analysis.

Result: Each group consisting of 50 patients underwent Anorectal manometry and rectal compliance compared between all the three groups. Group 1 (H+F) was found to have mean rectal compliance of -0.100 ± 6.70 mL/mmHg, Group 2 (H-F) had a mean value of 8.92 ± 5.29 mL/mmHg and Group 3 (controls) had 13.08 ± 7.61 mL/mmHg of compliance. Group 1 had resting anal pressure of 115.04 ± 26.94mmHg, Group 2 had 79.92 ± 16.88 mmHg and Group 3 had 75.40 ± 28.39mmHg. The difference in rectal compliance and resting anal pressure was statistically significant between Group 1 & 2 and group 1 & 3. Group 2 had a lower rectal compliance and higher resting anal pressure than group 3 but not statistically significant.

Conclusion: Hemorrhoids cause significant decrease in rectal compliance and increase in resting anal pressure, more pronounced in fissure in ano as compared to healthy individuals. Therefore, these values can be used as the objective parameter which should be routinely measured in these patients and treatment aimed at correction of the same.

Keywords: Hemorrhoids, anal fissure, rectal compliance, resting anal pressure, anal manometry

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Introduction

Normal defecation is a complex process requiring sensory perception, physiological co-ordination i.e., as the rectum distends there is reflex relaxation of sphincter muscles and an increase in intra-abdominal pressure. Anal continence is most importantly maintained by resting anal tone,

maintained 70% by the internal anal sphincter (IAS) and 30% by the external anal sphincter (EAS). Anal continence is also maintained by rectum acting as a reservoir by virtue of its ability to relax in response to distension, this "adaptive relaxation" dissipates the desire of defecation by lowering the intra-luminal pressure and accommodating more stool and by voluntary contraction of the EAS. This forms the basis of Rectal Compliance and reflects its distensibility. Rectal compliance is a dynamic value and can be calculated during anal manometry by inflating an intra-rectal balloon and measuring the pressure at the maximum tolerable volume and plotting a dV/dP curve. Normal rectal compliance is 6-20 mL/mmHg.

Rectal compliance assesses the rectal wall stiffness which is said to be reduced in inflammatory conditions like fissure in ano, which can cause a hypersensitive rectum.[2] Even higher grades of hemorrhoids can have decreased compliance and increased pressure due inflammatory changes and vascular hyperplasia. Resting anal pressures (normal = 40-80 mmHg) are elevated in both hemorrhoids and anal fissure as compared to normal, with values higher in fissure in ano.Thus, rectal compliance offers a unique opportunity to fill the paucity of an objective parameter to gauze the disease in patients of hemorrhoids/fissure. Our study was to calculate rectal compliance and resting anal pressure in patients suffering from hemorrhoids with or without fissure and comparing the value with healthy individuals after evaluating them objectively.

Material and Methods

Study was conducted in 150 patients admitted in Sir Ganga Ram Hospital after written informed consent and IRB (ethical committee) approval. Patients with any anorectal pathology apart from hemorrhoids or fissure, any operated cases of anorectal region, those on prolonged medication, patients with hypothyroidism, hyperparathyroidism, diabetes mellitus were excluded from the study. Patients under the age of 20 years or above 80 years and those who refused to take part in the study were also excluded. These patients were divided into three groups 1 included patients having Hemorrhoids with fissure (H+F), n=50, Group 2 included patients having Hemorrhoids without fissure (H-F), n=50 and Group 3 included patients without any anorectal pathology (C), n=50. All the groups were subjected to Anal Manometry using a multi-channel water perfused manometer of make "Mui Scientific: Mississauga, Ontario, Canada". The pressure and volume values were measured with these values the software calculated the Rectal compliance in each patient at the time of maximum tolerable volume, resting anal pressure was also measured. Comparisons were done between the values in controls with the patients with hemorrhoids and those with both hemorrhoids and fissure. Statistical analysis was done by SPSS and for comparison Chi-square test, Anova test and Levene's test were used as applicable and a p-value of <0.05 was considered as statistically significant.

Result

The study included 150 patients divided into 3 groups with 50 patients each Group 1 (H+F) patients with hemorrhoids and fissure, Group 2 (H-F) patients with hemorrhoids without fissure and Group 3 Control group. Comparison was done between all three groups and results were analyzed. Rectal compliance was found to be lowest in Group 1 with a mean of -0.100 ± 6.70 mL/mmHg, higher than that was seen in Group 2 (mean 8.92 ± 5.29 mL/mmHg) and normal values were seen in Group 3 mean value 13.08 ± 7.61 mL/mmHg (Table 1).

Table 1: Comparison of rectal compliance.

	Rectal Compliance (Mean) (mL/mmHg)	Highest value(mL/mmHg)	Lowest value(mL/mmHg)
Group 1 (Hemorrhoids + fissure)	-0.100 ± 6.70	2.66	-2.86
Group 2 (Hemorrhoids - fissure)	8.92 ± 5.29	11.10	6.73
Group 3 (Controls)	13.08 ± 7.61	16.232	9.94

Comparison between the groups was done to deduce that rectal compliance was significantly lower in Group 1 as compared to both Group 2 and Group 3. When rectal compliance was compared between Group 2 and Group 3, Group 2 had a lower compliance as compared to Group 3, but it was not statistically significant.

Table 2: Comparison of difference in rectal compliance between the 3 groups.

	Group 1 + Group 2	Group 1 + Group 3	Group 2 + Group 3
P- value	0.000	0.000	0.073

The comparison of rectal compliance between the males and females was not found to be statistically significant amongst all the groups (Table 3).

Table 3: Comparison of rectal compliance amongst genders.

		Rectal Compliance (mL/mmHg)	P value
Group 1	Male	0.8 ± 5.86	0.523
	Female	0.9 ± 7.54	
Group 2	Male	10.43 ± 6.53	0.183
	Female	7.48 ± 3.05	
Group 3	Male	12.31 ± 9.42	0.746
	Female	13.31 ± 5.16	

Resting anal pressure was found to be the highest in Group 1 with a mean of 115.04 ± 26.94 mmHg, further lower in Group 279.92 ± 16.88 mmHg and normal values in Group 3, 75.40 ± 28.39 mmHg mean value (Table 4).

Table 4: Resting anal pressures in the 3 groups.

	Mean resting analpressure (mean)(mmHg)	Highest value (mmHg)	Lowest value(mmHg)
Group 1	115.04 ± 26.94	126.16	103.92
Group 2	79.92 ± 16.88	86.89	72.95
Group 3	75.40 ± 28.39	87.12	63.88

Comparison between the three groups was done and the difference was found to be significantly higher in Group 1 as compared to Group 2 and 3. Amongst Group 2 and Group 3, Group 2 had a higher resting anal pressure, but the difference was not statistically significant (Table 5).

Table 5: Comparison of resting anal pressures between the 3 groups.

	Group 1 + Group 2	Group 1 + Group 3	Group 2 + Group 3
P-value	0.000	0.000	0.793

Discussion

We conducted this study to evaluate objectively, by anal manometry the changes that occur in Hemorrhoids with or without fissure and we solidified our findings by comparing them with individuals without any anorectal pathology. In our study we found that Group 1 (H+F) had greatly reduced rectal compliance, fissure in ano being an inflammatory condition. Group 2 (H-F) also had lower rectal compliance, but it was not as reduced as Group 1, this can be attributed to the fact that higher grades of hemorrhoids also have some inflammatory changes in the rectal wall, as also shown by Ho, Seow-Choen and Goh in their study showing vascular wall inflammation and also that of anal cushions. Group 3 had normal compliance which was significantly higher than Group 1, this group also had a compliance higher than Group 2 but the difference was not significant.

Amongst all the three groups there was no significant difference in compliance when gender was compared. The patients suffering from both hemorrhoids and fissure (Group 1) had the maximum resting anal pressure whereas those with only hemorrhoids (Group 2) had a lower pressure, but it was still higher than the normal individuals (Group 3). Ho et al, in their study showed similar findings with higher resting anal pressures in hemorrhoids and lower rectal compliance when compared to healthy people.[10]

Therefore, we conclude hemorrhoids cause a significant decrease in rectal compliance and increase in resting anal pressure, which is more pronounced when associated with fissure in ano, depicting the fact that rectal compliance is significantly decreased in inflammatory conditions of anorectum and increasing the anal pressure. Rectal compliance in combination with resting anal pressure,via anal manometry, should be used as the routine objective parameter for these anorectal pathologies and treatment aimed at correction of them.

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