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Predictive Accuracy of Goodsall's Rule for Fistula-in-Ano in Current Scenario

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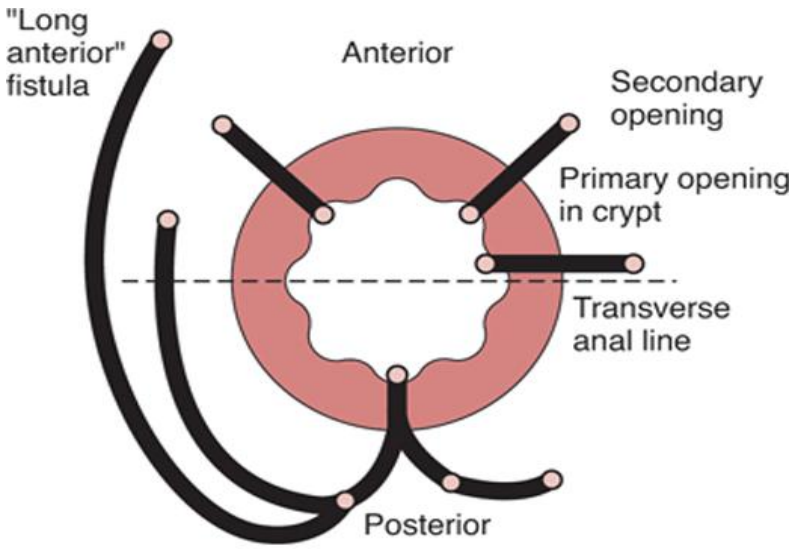
Abstract: ***Introduction: Fistula-in-ano is very challenging for a surgeon to treat, because of its complexity in identifying the tract, and this can be achieved only by knowing the primary and secondary opening. The Goodsall's rule enables identification of the internal opening whether anterior or posterior with relation to its external opening. High complication rates after the surgery are due to the presence of secondary paths or flaws in the identification of the primary internal opening. So, there is a necessity in assessing the Goodsall's rule with modern imaging techniques. Objectives: To estimate the predictive accuracy of Goodsall's Rule for Fistula-in-ano. Methods: Thorough clinical history, per rectal examination, proctoscopy, MRI fistulogram and Surgery Results: The predictive accuracy of Goodsall's rule is 64%. Out of 45 patients, 29 patients obeyed Goodsall's rule, 16 patients did not obey Goodsall's rule.16 patients had anterior fistula of which 13 patients obeyed Goodsall's rule which constitutes 81.3% of patients, 26 patients had posterior fistula of which 15 patients obeyed Goodsall's rule which constitutes 57.7% and 3 patients had both anterior and posterior fistulas of which 1 patient obeyed Goodsall's rule. Conclusion: Our study shows Goodsall's rule is of limited use for pre-operative planning of perianal fistula. Goodsall's rule is mostly applicable for anterior fistulous openings, perianal fistula that are closer to the anal verge and with internal openings in their midline. Pre-operative MR fistulogram identifies the internal openings, secondary tracts, relation of the fistulous tract with the anal sphincters precisely.***

Keywords: Fistula in ano, Park classification, Goodsall's rule, MR Fistulogram, St.James university Classification

1. Introduction

Fistula in ano is a chronic abnormal communication lined by granulation tissue which runs outwards from the anorectal lumen (internal opening) to an external opening on the skin of the perineum or buttock. It results from persistent communication between the anal canal and perianal skin following spontaneous or surgical drainage of perianal abscesses. It can be classified as intersphincteric, transphincteric, suprasphincteric and extrasphincteric based on the parks classification. Goodsalls rule used to indicate the position of internal opening according to the position of external opening.



Objectives:
Revisiting the goodsalls' rule in fistula in ano after 100 years in the modern era of MR fistulogram.

2. Materials and Methods

The study was conducted in a tertiary care hospital for a period of two years from 2019 to 2021.All the individuals who had the diagnosis of fistula in ano and who underwent surgery for fistula in ano were included in the study, after excluding recurrent fistula in ano. Detailed physical examination with proctoscopy and MR fistulogram was done for all patients. Goodsall's rule for each case is

formulated preoperatively. Goodsall's rule was checked with reports of MR fistulogram and confirmed during surgical procedure.

3. Results

Totally the study was conducted on 45 patients. Most of the patients falls between the age group of 31 to 40 years of age, Out of 45 patients 40 patients were male. On clinical examination 84.44% of patients had single external opening,13.33% of patients had two external opening ,1 patient had three external opening.35.56% of patients had anterior fistulas and 57.78% of patients had posterior fistluas and 3 patients had both anterior and posterior fistulas. The overall accuracy of goodsall's rule is 64% following clinical examination. Internal opening was identified clinically in 32 patients only (71.11%).The commonest position of internal opening was 6 o clock position on clinical examination,63.15% of intersphincteric fistula obeyed goodsalls rule,66.67% of transphincteric fistula obeyed goodsalls rule as per MR fistulogram report .One patient who had both obeyed goodsalls rule

Data Analysis

Clinical exam- External opening of fistula position		
Clinical exam- External opening of fistula	Frequency	Percent
Anterior	16	35.56%
Posterior	26	57.78%
Anterior& posterior	3	6.67%

57.78% of the participants had external opening posteriorly.

A 48.89% of patients had external opening in less than 1.5cm distance from anal verge. 51.11% of patients had external opening more than 1.5 cm distance from anal verge.

Table 3.1: Distribution of Goodsall's rule

Goodsall's rule	Frequency	Percent
Applicable	29	64.00%
Not applicable	16	36.00%

Goodsall's rule was applicable for 64% of the patients as per preoperatively.

Comparison of position of external opening of Fistula and Goodsall' s rule: as per preoperatively

Clinical exam- External opening of fistula	No.of cases obeying Goodsall's rule	No.of cases not obeying Goodsall rule	Odds Ratio	P value
Anterior and Posterior	1(33.3%)	2(66.7%)		
Anterior	13(81.3%)	3(18.7%)	8.7	0.09
Posterior	15(57.7%)	11(42.3%)	2.7	0.7

Those with external opening of fistula in anterior position had 8.7 times more odds of obeying Goodsall's rule and those in posterior position had 2.7 times more odds of obeying Goodsall rule. However, they were not significant ($p>0.05$).

Those with more distance of >1.5 cm external fistula opening from the anal verge had 7 times more odds of having applicable goodsall rule and it was statistically significant.

According to St James University classification, My study showed 42.20% patients had type I perianal fistula,33.33% of patients had type II perianal fistula ,8.90% patients had type III perianal fistula, 4.40% patients type IV perianal fistula,1 patient had both type I and type III perianal fistula, Type V not seen.78.94% of type I ,46.67% type II,75% type III,50% of type IV obeyed Goodsalls rule.

As per MR fistulogram out of 45 patients ,22 patients had their external opening within 1.5cm from anal verge and 23 patients had their external opening beyond 1.5 cm ,81.8% of perianal fistula with their external within 1.5 cm from analverge obeyed goodsalls rule while only 47.8% of perianal fistula with their external opening beyond 1.5 cm obeyed goodsalls rule. Those with more distance from the anal verge had 4.9 times more odds of having applicable goodsalls rule and it was statistically significant.($P<0.05$)

4. Discussion

Goodsall's rule was named after David Henry Goodsall who described it in 1900.It states that if a transverse line is drawn at the level of midpoint of anus, fistula with their external openings anterior to this line, have tracts with direct linear course opening internally and those with external opening posterior to this line have tracts with curvilinear course to open into the posterior midline of the anal canal. A low anal fistula with an external opening situated posteriorly, has a tract which takes a direct course rather than a curvilinear course.

Magnetic resonance imaging for fistula in ano is an imaging technique to create an image of the sphincter muscles ,the anal canal and it's surrounding soft tissues. A fistula is an abnormal connection or passage way that connects two organs or vessels that usually do not connect, MR fistulogram is the best option for the diagnosis fistula in ano. In this study MR fistulogram had identified the fistulous tract in all patients. The accuracy of MR fistulogram in identifying the type of fistulous tract is 93.33%,the accuracy of identification of internal opening is 95.56%,MR fistulogram improves the diagnosis of internal opening by 24% which is statistically significant ,these results were in concordance with the study conducted by beets- tan et all which showed the sensitivity and specificity.

In this study, Goodsall's rule was applicable for the majority of the patients, 64% of patients applicable for goodsalls rule.81.3% of patients with external opening of fistula in anterior position obeying goodsall's rule and 57.7% of patients with external opening of fistula in posterior position obeying goodsall's rule. Those with external opening of fistula in anterior position had 8.7 times more odds of obeying goodsall's rule and those in posterior position had 2.7 times more odds of obeying Goodsall's rule. Goodsall's rule identified the internal opening in 64% of patients

preoperatively so Goodsalls rule is good as MRI in identifying the internal opening.

5. Conclusion

In our study, the predictive accuracy of Goodsall's rule was 64% which still used as a gold standard method especially in fistulas with anterior fistulous opening and perianal fistula that are closer to the anal verge and with internal openings in midline. So preoperative MR fistulogram helps in fistula with posterior opening and when the external opening is more than 1.5cm from the anal verge and with multiple fistulous openings in planning the best possible surgical option to prevent recurrence.

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