




## Review Article

# “PNR-Bleed” classification and Hemorrhoid Severity Score—a novel attempt at classifying the hemorrhoids

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### ABSTRACT

Hemorrhoids are the most common anorectal disorders with a prevalence of 39% in general population. Hemorrhoids are generally classified on the basis of their location and degree of prolapse. Goligher's classification does not describe the number of hemorrhoidal columns involved and does not give much consideration to the amount of blood loss. To describe the hemorrhoidal disease more vividly, we devised the “PNR-Bleed” (or PNR-Booking) classification system. We tried to classify the hemorrhoids based on the four main characteristics of the hemorrhoidal disease i.e. the degree of hemorrhoidal Prolapse (P), Number (N) of the primary hemorrhoidal columns involved, Relation (R) of the hemorrhoidal tissue to dentate line and the amount of Bleeding (B) from it. All the four components in this classification system are graded into five grades ranging from 1 to 5. The peculiarity of this new classification system is that it allows more detailed documentation of the hemorrhoids in a particular patient and conveys more explicit meaning and information about the hemorrhoids for future references. Based on this ‘PNR-Bleed’ classification, we are introducing another concept of scoring the severity of hemorrhoids and referred it as the Hemorrhoid Severity Score (HSS). Hemorrhoid Severity Score (HSS) is the total score obtained by the sum of the numerical grades of all four characteristics of hemorrhoids in “PNR-Bleed” classification. This new “PNR-Bleed” system of classifying the hemorrhoids and calculation of HSS seems to be more comprehensive, detailed, more objective and easily reproducible.

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## Classificação “PNR-Bleed” e escore de gravidade das hemorróidas - uma nova tentativa de classificação de hemorróidas

### R E S U M O

#### Palavras-chave:

Hemorróidas  
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PNR-Bleed  
Goligher  
Prolapso  
Escore de gravidade de hemorróidas

As hemorróidas são os distúrbios anorretais mais comuns, com uma prevalência de 39% na população em geral. As hemorróidas são geralmente classificadas com base em sua localização e grau de prolapso. A classificação de Goligher não descreve o número de colunas hemorroidais envolvidas e não dá muita importância à quantidade da perda de sangue. Para descrever a doença hemorroidária de maneira mais precisa, criamos o sistema de classificação “PNR-Bleed” (ou PNR-Booking). Tentamos classificar as hemorróidas com base nas quatro principais características da doença hemorroidária, isto é, o grau de prolapso da hemorroide (P), número (N) das colunas hemorroidais primárias envolvidas, a relação (R) do tecido hemorroidário para a linha denteada e a quantidade de sangramento (B) originando-se dele. Todos os quatro componentes deste sistema de classificação são classificados em cinco graus, variando de 1 a 5. A peculiaridade desse novo sistema de classificação é que ele permite uma documentação mais detalhada das hemorróidas em um paciente em particular e transmite o significado e informações mais explícitos sobre as hemorróidas para referências futuras. Com base nessa classificação “PNR-Bleed”, estamos introduzindo outro conceito para o escore da gravidade das hemorróidas e denominado HSS, de “*Hemorrhoid Severity Score*”. O escore de gravidade da hemorroide (HSS) é o escore total obtido pela soma dos graus numéricos de todas as quatro características das hemorróidas na classificação “PNR-Bleed”. Esse novo sistema “PNR-Bleed” de classificação de hemorróidas e cálculo do HSS parece ser mais abrangente, detalhado, mais objetivo e facilmente reproduzível.

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## Introduction

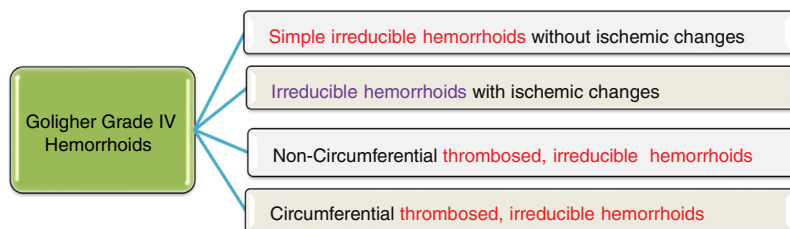
Anal cushions are the fibro-elastic connective tissue containing, blood filled vascular structures normally present in the anal canal. When engorged with blood, these anal cushions help to maintain anal continence and protect the underlying anal sphincters during defecation.<sup>1</sup> The sensitive mucosa overlying the anal cushions also play a key role in differentiating between liquid, solid and gas contents of the anal canal and the subsequent decision to evacuate.<sup>2</sup> Hemorrhoids or piles are symptomatically enlarged and distally displaced anal cushions. It is one of the most common anorectal disorders with a prevalence of 39% in general population. And about 45% of patients with hemorrhoids are symptomatic.<sup>3,4</sup>

The presentation and symptomatology of hemorrhoids is extremely heterogeneous, hence the Colorectal or General surgeon cannot be of the mindset that a single technique is suitable for all patients with hemorrhoids. As our understanding and experience of each surgical method for the hemorrhoids evolves, we now understand that the grade of hemorrhoids has a profound effect on the evaluation of outcome. Ideally each grade of hemorrhoids should be considered as a separate entity when evaluating the available surgical options. One method that is effective for a certain grade of hemorrhoids may have a high rate of recurrence with another grade.<sup>5</sup> Besides considering the grade of hemorrhoids, the surgical management can be truly tailored to the patients' needs after giving due consideration to size and extent of circumferential involvement of hemorrhoids and the

presence of acute severe bleeding and thrombosed painful pile.<sup>5</sup>

A classification system for any disease is useful for not only in choosing an appropriate treatment for a particular class, but also to allow the comparison of various available treatment options. Hemorrhoids are generally classified on the basis of their location and degree of prolapse. However none of the classification systems for hemorrhoids is complete to give the full clinico-pathological description of hemorrhoids in a particular patient. Depending on the relation to the dentate line, the hemorrhoids are classified into internal, external and mixed type. The internal hemorrhoids originate above the dentate line and are covered by mucosa (columnar or cuboidal epithelium) while as the external hemorrhoids arise below the dentate line and are covered by anoderm (squamous epithelium). Mixed (interno-external) hemorrhoids arise both above and below the dentate line. Another less known classification system used for hemorrhoids is based on anatomical findings of hemorroidal position, described as primary, secondary or circumferential and based on symptoms described as prolapsing and non-prolapsing.<sup>6</sup> Primary hemorrhoids arise at the classically described three primary positions of the anal cushions while as the secondary hemorrhoids arise in between the primary anal cushions.

However the most widely used classification system for hemorrhoids is the one proposed by Goligher. In Goligher's classification, internal hemorrhoids are further graded based on the degree of prolapse: (1) Grade I: bleeding but non-prolapsing hemorrhoids; (2) Grade II: hemorrhoids prolapse on straining but reduce spontaneously; (3) Grade III: hemor-



**Fig. 1 – Goligher’s Grade IV hemorrhoids as a heterogeneous group.**

rhoids prolapse but require manual reduction; and (4) Grade IV: irreducibly prolapsing hemorrhoids.<sup>7</sup> One of the drawbacks of Goligher’s classification is that acutely thrombosed, incarcerated internal hemorrhoids and incarcerated, thrombosed hemorrhoids involving circumferential rectal mucosal prolapse are also categorized as fourth-degree hemorrhoids along with simple irreducible hemorrhoids.<sup>7</sup> This accumulation of all these clinical varieties of hemorrhoids, makes the Grade IV hemorrhoids a very heterogeneous group (Fig. 1) with diverse treatment options for each variety in the group. Also Goligher classified hemorrhoids based only on the degree of hemorrhoidal prolapse. This classification does not describe the number of hemorrhoidal columns involved nor does it describe the size of the hemorrhoids and whether they are isolated or circumferential. It also does not give much consideration to the amount of blood loss due to hemorrhoidal disease. These factors, which are missing from Goligher’s classification, are important in the selection of appropriate treatment. For example, as the Goligher’s classification does not tell about the relation of hemorrhoidal mass with the dentate line, so it will be difficult to ascertain on Goligher grading that whether the patient could be given the sclerotherapy and rubber band ligation or not; as both are contraindicated in hemorrhoids below dentate line. In the Goligher’s classification there is also no mention of whether there is any presence of secondary hemorrhoids or not.

Recently an attempt at reclassifying the hemorrhoids by Agarwal et al.<sup>8</sup> has suggested to add a suffix to the primary grade of hemorrhoids. The addition of this suffix depends upon the number of hemorrhoids involved and presence of thrombosis. Though to some extent, this classification has tried to take into account the number or the degree of circumferential involvement of hemorrhoids but rest it has almost same drawbacks as that of Goligher’s classification. In this classification, there is totally no mention of bleeding due to hemorrhoids and its relation to the dentate line. Second thing, they have mentioned Grade I hemorrhoids as “remaining inside the anal canal” but this definition of Grade I hemorrhoids does not exclude the normal anal cushions. Also Grade IV hemorrhoids in this classification are again a heterogeneous group combining the complicated irreducible hemorrhoids and the simple external hemorrhoids.

### “PNR-Bleed” classification of hemorrhoids and its potential advantages

The above mentioned drawbacks of the Goligher’s classification and the lack of any other suitable classification system

led us to think and try to develop a more comprehensive classification system for the hemorrhoids. In order to overcome these drawbacks, we devised the ‘PNR-Bleed’ (or PNR-Booking) classification system so as to describe the hemorrhoidal disease more vividly (Table 1). The peculiarity of this new classification system is that it allows more detailed documentation of the hemorrhoids in a particular patient and conveys more explicit meaning and information about the hemorrhoids for further management and future references. Conceivably it may also help us in better comparison of various treatment options for hemorrhoids with respect to therapeutic outcomes, recurrence rates and various complications. The reciprocal reproduction of information about the hemorrhoidal disease of a patient encrypted in the mnemonic of ‘PNR-Bleed’ classification will be done probably in a broader and more astute way than from the Goligher’s grading system. The inter-observer bias (different surgeon examining the same patient) in grading the hemorrhoids may also be minimized with the introduction of this new instrument (PNR-Bleed) for classification and grading of hemorrhoids.

### Description of the “PNR-Bleed” classification

We tried to classify and describe the hemorrhoids based on the four main characteristics of the hemorrhoidal disease i.e. the degree of hemorrhoidal Prolapse (P), Number (N) of the primary hemorrhoidal columns involved, Relation (R) of the hemorrhoidal tissue to dentate line and the amount of Bleeding (B) from it. All the four components in this classification system are graded into five grades ranging from 1 to 5. Grade 1 means the normal anal cushions and the Grade 5 is the worst grade in a specific characteristic. This description is more informative and probably more objective than the simple Goligher grading of internal hemorrhoids. The four components of this “PNR-Bleed” classification (Table 1) are briefly described below:

*Degree of hemorrhoidal Prolapse:* In this heading, we have divided the degree of hemorrhoidal prolapse similar to that of Goligher grading except that we have subdivided the Goligher grade-IV into “PNR-Bleed” Grade 4 and 5, depending upon the presence or absence of ischemic or necrotic changes (Table 1).

*Number of hemorrhoidal columns involved:* In Goligher grading there is no mention of the number of the masses of hemorrhoidal tissue involved in the prolapse. To overcome this shortcoming we divided the hemorrhoidal disease again into five grades (Table 1). Grade 1 means that all anal cushions are normal while as the Grade 5 means circumferential involve-

**Table 1 – “PNR-Bleed” classification of hemorrhoids.**

S. n <sup>o</sup>	Characteristic	Grade	Description
A	Degree of hemorrhoidal prolapse	1	No hemorrhoidal prolapse
		2	Prolapse upon straining that reduces spontaneously
		3	Prolapse upon straining that needs manual reduction
		4	Prolapsed and irreducible hemorrhoids but without ischemic changes.
		5	Prolapsed and irreducible hemorrhoids with ischemic (gangrenous) changes.
B	Number of hemorrhoidal columns involved	1	None
		2	One
		3	Two
		4	Three
		5	Circumferential (presence of secondary hemorrhoids along with the involvement of all primary hemorrhoids)
C	Relation to dentate line	1	Nil (normal anal cushions)
		2	External hemorrhoids
		3	Internal hemorrhoids
		4	Interno-external hemorrhoids
		5	Thrombosed external hemorrhoids
D	Bleeding	1	Nil
		2	Mild; occasional episodes (during defecation)
		3	Moderate; frequent episodes (during defecation)
		4	Severe; persistent bleeding even without defecation with fall in Hb level (<10 gm/dL); requiring hematinics.
		5	Very severe; bleeding in the form of jets and splashes with severe fall in Hb level (<7 gm/dL); requiring blood transfusion.

ment of the hemorrhoidal disease i.e. besides the involvement of all the three primary hemorrhoidal masses there is presence of secondary hemorrhoids in-between the primary ones.

**Relation to dentate line:** According to the relation of hemorrhoidal tissue to dentate line we have divided the hemorrhoidal disease again into five grades (Table 1). In view of the severity of the thrombosed external piles we have separately grouped them from the simple external piles into Grade 5.

**Bleeding:** Bleeding is the most important and alarming symptom of hemorrhoids that almost always brings the patient to the doctor. However this symptom and amount of bleeding has been given little or no consideration in the Goligher classification. The degree and severity of bleeding in hemorrhoids is again divided into five grades (Table 1) in our classification.

#### Documentation and nomenclature

Documentation of hemorrhoidal grades will be similar to as we write the GCS score for head injury patients. This documentation should be done on patient's case records only after completing the history and clinical examination especially the P/R proctoscopy of the patient. To describe and to document for further references, we will write the first four letters of the mnemonic “PNR-Bleed” i.e. P N R B and add a numerical subscript of the grade of involvement in every characteristic, in a particular patient. For example a hemorrhoidal mass that prolapses on straining but reduces spontaneously (Grade 2), involving only one hemorrhoidal column (Grade 2), interno-external (Grade 4) in relation to dentate line with only mild occasional bleeding (Grade 2) will be written as “P<sub>2</sub>N<sub>2</sub>R<sub>4</sub>B<sub>2</sub>” and its total hemorrhoidal score will be 10/20.

#### Hemorrhoid Severity Score (HSS)

Based on this “PNR-Bleed” classification, we are introducing another concept of scoring the severity of hemorrhoids. In this article, we are referring this scoring system for hemorrhoids as the Hemorrhoid Severity Score (HSS). Hemorrhoid Severity Score (HSS) is the total score obtained by the sum of the numerical grades of all four characteristics of hemorrhoids in “PNR-Bleed” classification. For example, for a patient having hemorrhoidal prolapse that requires the manual reduction (P<sub>3</sub>) involving all the three primary hemorrhoidal masses (N<sub>4</sub>), which are interno-external with respect to the relation with dentate line (R<sub>4</sub>) and having frequent bleeding during defecation (B<sub>3</sub>), the HSS is 14/20 (3 + 4 + 4 + 3 = 14).

Minimum HSS score is 4 and maximum score can be 20. HSS score of a normal person without any signs and symptoms of hemorrhoids is “4”. Calculation of the HSS in a patient of hemorrhoids will help in quantification of the hemorrhoidal disease for further references. It will be helpful in post-treatment patient follow-up to grade the response to treatment and to assess the effectiveness or failure of any particular treatment regime for hemorrhoids. It may also be used in predicting and diagnosing the recurrence after any form of treatment for the hemorrhoids. Also the PNR-Bleed classification and the HSS may allow the comparison of various treatment options with respect to therapeutic outcomes, recurrence rates and various complications.

The future studies are expected to define the treatment options more clearly for hemorrhoids based on HSS. For example, the different HSS range group patients of hemorrhoids can be allocated (based on future studies) to either conservative management group (in the form of dietary and life style modifications and medications) or to the office based procedures group (sclerotherapy and RBL) or to the surgical procedures group. Also the incidence and type of surgical complications

may be possibly predicted based upon preoperative PNR-Bleed classification status and HSS. Moreover the various treatment options for hemorrhoids can be better compared (in future studies) based on more comprehensive HSS rather than simpler Goligher's grading.

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## Discussion

Our purpose of this new classification is to provide a better classification system for hemorrhoids than the existing ones. In this heading of 'Discussion', we may try to answer some questions so as to make this PNR-Bleed classification system more vivid and easily understandable.

First question is that, why did not we involve other symptoms of hemorrhoids like mucous discharge, pruritus and perianal discomfort in this classification system? While answering this question at the outset, it may be pertinent to mention that it is difficult to include every detail of any disease in its classification. That will make the classification somewhat cumbersome. Besides the degree of circumferential involvement and the relation of the hemorrhoidal mass with the dentate line; we have involved two main symptoms i.e. the degree of prolapse and severity of the bleeding for setting forth this new classification. Because as you will be aware that the most common clinical presentation of hemorrhoidal diseases is the mass coming out of anas and bleeding per rectum. The other symptoms mentioned above are usually the secondary effects of these two primary symptoms. Like whenever there is excessive and somewhat permanent prolapse of the hemorrhoidal mass, it is associated with the soaking of the undergarments with mucous discharge. This mucous is secreted by the anal canal mucosa covering hemorrhoids that lies outside the sphincter mechanism. This mucous and other discharge with repeated chemical and physical irritation of the prolapsed hemorrhoids and perianal skin ultimately gives rise to pruritus which may inturn result in persistent perianal discomfort or even pain.

Second question we would like to discuss here is that whether or not this classification system can be used to follow or monitor the patient of hemorrhoidal crisis to track down its improvement or deterioration on the lines of hemorrhoidal clinical signs. To this query we may say that this is one of the purposes and uses of this PNR- Bleed classification and HSS i.e. by calculating the score we may be able to monitor and follow more objectively any treatment regimen for such hemorrhoidal crisis situations. Hence we may regularly assess whether the specific management protocol is leading to improvement or deterioration of hemorrhoidal disease e.g. if a patient with permanently prolapsed hemorrhoids without ischemic changes ( $P_4$ ) involving two hemorrhoidal columns ( $N_3$ ), externo-internal in position with respect to dentate line ( $R_4$ ) with history of occasional bleeding during defecation ( $B_2$ ) with total score (HSS) of 13 ( $P_4N_3R_4B_2$ ); is time-being managed conservatively so as to decrease the edema and the mass of the hemorrhoidal tissue to avoid the complications of operating in such setting. We may note down the score as described above on daily basis and assess whether the total score or the score of any or many components of this classification system are improving or deteriorating. This will help us to take a

wiser decision about the continuation or abandonment of this particular conservative treatment regimen.

Other query raised is that, "will medical management of hemorrhoids be able to change the PNR-Bleed classification status and HSS of a patient?" Medical management of hemorrhoids will definitely change the score e.g. if a patient has hemorrhoids that require manual reduction ( $P_3$ ) and bleeds more often during defecation ( $B_3$ ) and is put on medical management (toilet training, high fiber diet, laxatives and oral/topical calcium dobesilate). He may respond to this medical management and will completely stop the bleeding per rectum ( $B_1$ ) and his prolapse may also improve; like he may now be having hemorrhoidal prolapse that reduces spontaneously ( $P_2$ ). Likewise some early grade hemorrhoidal columns may completely disappear with medical management, thus decreasing the numbering of N-component of the classification system and hence the overall HSS. In this way again we may be able to assess the effectiveness of different treatment protocols for hemorrhoids.

Last confusion that we may like to clear is that somebody may confuse by saying that the patient with irreducibly prolapsed hemorrhoids without ischemic changes ( $P_4$ ) will apparently quantify to the same extent as that of simple externo-internal hemorrhoids ( $N_4$ ) i.e. is  $P_4$  hemorrhoidal disease as severe as  $N_4$  disease? To clear this confusion we may say that the purpose of this classification is to describe in a patient, the degree and burden of the hemorrhoidal disease as a whole and not just the individual components of hemorrhoids. We may compare the degree of prolapse of one patient with the degree of prolapse of other patient and so on. However we cannot compare the degree of prolapse of hemorrhoids with the number of hemorrhoidal columns involved just on the bases that their numbering in PNR-Bleed classification is same. This will be an irrational comparison. Because comparing the different components (total 4 components in this classification) of hemorrhoids of different patients will be unwise and unjust. That is we should always compare the scoring of the individual component with the identical component of other patient.

At the end we may say that our PNR-Bleed classification is just a hypothetical concept to improve the already existing classification systems for hemorrhoids and its utilization will be only discerned by future studies including RCTs. However also based on the future studies there is possibility of suggesting some ranges of HSS to be assigned to different treatment protocols.

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## Conclusion

PNR-Bleed classification takes into account all the four main characteristics of the hemorrhoidal disease i.e. the degree of hemorrhoidal prolapse, number of the primary hemorrhoidal columns involved, relation of the hemorrhoidal tissue to dentate line and the amount of bleeding from it. This new system of classifying the hemorrhoids seems to be more comprehensive, detailed, more objective and easily reproducible. This new classification of hemorrhoids may provide new dimension of research for the management of hemorrhoidal disease. Also the PNR-Bleed classification and the

Hemorrhoidal Severity Score (HSS) may allow the comparison of various treatment options with respect to therapeutic outcomes, recurrence rates and various complications. However further studies need to be done to validate the utility of “PNR-Bleed” classification system and Hemorrhoidal Severity Score (HSS).

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### Conflicts of interest

The authors declare no conflicts of interest.

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