Advances in Hemorrhoidal Disease Assessment Classification Systems and Analysis of Their Evaluative Value: A Postprint

Authors: Ni Jia-chun, Cai Zeng-jin, Hou Chang-cheng, Jiang Qiong, Kang Jian, Yang Xiang-dong, Fan Wen-bin

Date: 2022-10-13T00:00:00+00:00

Abstract

Hemorrhoidal disease is one of the common anorectal diseases in clinical practice. Its high incidence and recurrence rates impose pressure on both patients and physicians. Assessment of hemorrhoidal disease is a necessary prerequisite for diagnosis and treatment selection, and how to objectively assess hemorrhoidal disease and select appropriate therapeutic techniques is a focal concern for clinicians. In recent years, domestic and international scholars have focused on hemorrhoidal disease assessment and proposed various classification systems. This article reviews the research progress of hemorrhoidal disease assessment classification systems, aiming to analyze their evaluative value, explore their essential factors, principles of use, and composition of assessment items, propose optimization strategies for their limitations, and speculate on possible future development directions, in order to provide references for the development of hemorrhoidal disease assessment classification systems and clinical diagnosis and treatment.

Full Text

Preamble

Research Progress and Evaluation Value Analysis of Hemorrhoidal Disease Assessment and Classification Methods

NI Jiachun[1],[2], CAI Zengjin[2], HOU Changcheng[2], JIANG Qiong[1], KANG Jian[3], YANG Xiangdong[4], FAN Wenbin[1]*

[1]College of Traditional Chinese Medicine, Chongqing Medical University, Chongqing 400016, China
[2]Department of Proctology, Yongchuan Hospital of Traditional Chinese

Medicine, Chongqing Medical University, Chongqing 402160, China
[3]Department of Proctology, Affiliated Hospital of Chengdu University of Traditional Chinese Medicine, Chengdu, Sichuan Province, 610075, China
[4]Chengdu Anorectal Hospital, Chengdu 610015, China

Corresponding author: FAN Wenbin, Attending physician; E-mail: fanwenbin@cqmu.edu.cn

Abstract

Hemorrhoidal disease is one of the most common anorectal disorders in clinical practice, and its high incidence and recurrence rates create significant pressure for both physicians and patients. Assessment of hemorrhoidal disease is a necessary prerequisite for diagnosis and treatment selection, and how to evaluate hemorrhoidal disease objectively and choose appropriate therapeutic techniques remains a key concern for clinicians. In recent years, scholars worldwide have focused on hemorrhoidal disease assessment and proposed various classification methods. This article reviews the research progress of hemorrhoidal disease assessment classifications, analyzes their evaluation value, discusses their essential components, principles of use, and assessment items, proposes optimization strategies for their limitations, and speculates on future development directions, aiming to provide references for the development of hemorrhoidal disease assessment classifications and clinical diagnosis and treatment.

Keywords: Hemorrhoid; Symptom Assessment; Classification; Surgical Procedures, Operative; Review

Hemorrhoids are soft masses formed by pathological hypertrophy of anal cushions or dilated and congested veins beneath the anal canal mucosa [1-3]. Hemorrhoidal disease is a common anorectal disorder characterized primarily by prolapse, bleeding, and pain. Due to differences in race, ethnicity, ideology, national conditions, and customs, the prevalence of hemorrhoidal disease in European and American countries ranges from 4.4% to 38.93% [4-6]. In China, the overall incidence of anorectal diseases is 51.14%, with hemorrhoidal disease accounting for 50.28% [7], reaching up to 73.12% in some regions [8]. The high incidence of hemorrhoidal disease is accompanied by substantial economic burden; approximately 2.5 million people sought medical care for hemorrhoidal disease in the United States in 2014 [9], resulting in an estimated economic burden of $1.63 billion [10]. American scholar Bard argued that the high economic burden of hemorrhoidal disease stems not only from its incidence but more significantly from inappropriate diagnosis and treatment [11].

Hemorrhoidal disease assessment classification is a necessary prerequisite for clinical diagnosis and treatment, and accurate classification systems are essential for precise diagnosis and targeted therapy. How to accurately assess hemorrhoidal disease represents a major challenge in clinical practice. Currently, there is no unified international classification system for hemorrhoidal disease, with scholars from various countries proposing different methodologies based on diverse

perspectives. This article focuses on hemorrhoidal disease assessment classifications, aiming to analyze their current development status and evaluation value, and to provide references for future development and clinical application.

1. Classification Methods for Hemorrhoidal Disease Assessment

1.1.1 Goligher Classification

The Goligher classification was first proposed by British colorectal surgeon Goligher in 1961, categorizing hemorrhoids into four grades based on the degree of prolapse [12]. It is widely used in clinical practice and recommended by hemorrhoidal disease management guidelines in multiple countries [13-15]. Despite its high acceptance and broad application, some scholars have pointed out that it overlooks the dynamic evolution of hemorrhoidal disease and fails to consider other relevant symptoms, prompting the search for novel classification systems [16-17]. Dutch scholar Dekker surveyed 329 gastrointestinal surgeons and found significant inter-observer variability when using the Goligher classification, suggesting the need for a new classification combining objective and subjective assessments [18].

1.1.2 Indian New Hemorrhoidal Classification

The Indian new hemorrhoidal classification was first introduced in the 2017 "Practice Guidelines for Hemorrhoid Management"by the Association of Colon & Rectal Surgeons of India. Essentially an extension of the Goligher classification, it subdivides each grade based on the number and circumference of hemorrhoids to compensate for the limited assessment scope of the Goligher system. The classification includes a management algorithm linking assessment to treatment modalities, facilitating clinical decision-making [19].

1.1.3 Single Pile Classification (SPC)

Italian scholar Elbetti first proposed the SPC in 2015, arguing that the Goligher classification' s focus on the most severely prolapsed internal hemorrhoid fails to accurately assess the overall condition [20]. Based on the Goligher system, the SPC adds assessment items for fibrotic, non-elastic prolapsing hemorrhoids (F) and includes external hemorrhoid components: thrombosed hemorrhoids below the dentate line (E) and symptomatic skin tags (S). The classification employs a novel expression format; for example, a grade III fibrotic, non-elastic prolapsing hemorrhoid with a thrombosed external hemorrhoid at the 7 o' clock position is recorded as IIIFE7. To validate differences between SPC and Goligher classification, Elbetti evaluated 197 patients using both methods. Results showed consistent assessments for grade I and II hemorrhoids. However, among patients classified as grade III by Goligher, only 80.5% of individual hemorrhoids were grade III by SPC, while 44.3% were grade IV ($p<0.001$), confirming the Go-

ligher classification' s inadequacy in assessing severe hemorrhoidal disease and demonstrating SPC' s comprehensiveness [20].

1.1.4 Algorithm for Grading Prolapsing Hemorrhoids

Swedish scholar Gerjy proposed this algorithm in 2008, noting that traditional Goligher classification carries risks of misclassification (e.g., grade II often misclassified as grade III, and grade IV frequently accompanied by external hemorrhoids that may be confused with internal hemorrhoid prolapse) [21]. The algorithm uses anoscopy for grades I and II hemorrhoids and adds assessment items for external hemorrhoids and skin tags, presented in a flowchart (see Figure 1 [Figure 1: see original paper]). A multicenter prospective study validated the algorithm, showing that 69% of patients were preoperatively classified as grade III, while 89% were postoperatively graded as IA or IB [21].

Figure 1 Algorithm for grading prolapsing haemorrhoids

1.2.1 Japanese Colonoscopic Classification of Internal Hemorrhoids

Japanese scholar Sadahiro first proposed colonoscopic assessment of internal hemorrhoids in 1998 [22], later refined by Akihisa who emphasized bleeding as a primary symptom and advocated endoscopic band ligation (EBL) as treatment [23]. The classification includes assessment items for internal hemorrhoid-to-rectal circumference ratio, hemorrhoid diameter, and red signs. A prospective clinical study by Akihisa' s team demonstrated high correlation between this classification and bleeding symptoms, as well as its utility in evaluating treatment efficacy [23]. However, the 2017 "Japanese Practice Guidelines for Anal Disorders I. Hemorrhoids" explicitly deemed this classification non-standard and did not recommend its use [24].

1.2.2 PNR-Bleeding Classification

Indian scholar Khan argued that the Goligher classification omits bleeding and hemorrhoid number from assessment and that grade IV classification is overly broad [25]. To comprehensively evaluate hemorrhoidal disease, Khan proposed the PNR-bleeding classification in 2020, assessing Prolapse (P), Number of hemorrhoids (N), Relationship to dentate line (R), and Bleeding. All items are graded 1-5 based on severity, with grade 1 representing normal tissue. The prolapse item builds upon Goligher classification but subdivides grade IV based on ischemia and necrosis, while the bleeding item quantifies bleeding amount and pattern more objectively. Essentially an optimized version of Goligher classification requiring minimal additional memorization, it demonstrates reasonable practicality but lacks integration with treatment modalities and prospective clinical studies validating its differences from Goligher classification, necessitating further research.

1.3.1 Lunniss Classification of Internal Hemorrhoids

British scholar Lunniss proposed this classification in 2003, arguing that assessment systems should reflect the dynamic changes in hemorrhoidal symptoms and that comprehensive symptom evaluation is necessary to accurately represent disease severity [26]. The Lunniss classification divides hemorrhoids into two categories (non-prolapsing, prolapsing) with five stages (0-4), including two non-prolapsing and three prolapsing stages. Each stage assesses primary symptoms (prolapse, bleeding), additional symptoms (itching, skin tags, fecal soiling, pain, other complications), visual size, and age of onset. The inclusion of subjective items like itching and pain compromises objectivity, and the numerous assessment items reduce practicality.

1.3.2 Anatomical/Clinical-Therapeutic Classification (A/CTC)

Italian scholar Gabriele introduced A/CTC in 2020, noting that Goligher classification lacks quantification of prolapse, assessment of symptom types, and correlation with treatment modalities [27]. A/CTC includes assessment items for anatomical features (internal hemorrhoid prolapse, external hemorrhoids), symptom types (bleeding, discharge, edema), symptom frequency, and lists complications and contraindications for treatment modalities to help avoid surgical risks. However, this classification also includes subjective assessment items and cumbersome content, limiting its practicality and objectivity.

1.3.3 BPRST Classification

Brazilian scholar Carlos noted that hemorrhoidal disease includes both internal and external components, while Goligher classification omits external hemorrhoids and cannot accommodate newer treatment modalities. Inspired by the TNM staging system for cancer, Carlos proposed the BPRST classification in 2019, comprising five-dimensional assessment of Bleeding, Prolapse, Reduction, Skin tags, and Thrombosis (see Table 1) [28]. The BPRST system classifies hemorrhoidal disease into three stages: Stage I (B1P0R0S0T0) manageable with lifestyle modification and office procedures; Stage II (any B + P1 or P2 or R1 + T0) treatable with Stage I methods and non-excisional perianal procedures (especially for circumferential prolapse); Stage III (any B + any P + R2 or S1 or T1) primarily requiring excisional perianal procedures or non-excisional procedures combined with external hemorrhoidectomy. In a subsequent prospective study of 229 patients evaluated by both Goligher and BPRST classifications [29], 6 of 29 patients originally graded as Goligher I were reclassified as BPRST III and underwent conventional hemorrhoidectomy; 37.7% of Goligher II patients were reclassified as BPRST III; 67.1% of Goligher III patients were reclassified as BPRST II; and all Goligher IV patients were classified as BPRST III, suggesting BPRST' s superiority in classification and treatment selection.

Table 1 BPRST Classification

Bleeding (B)	Prolapse (P)	Reduction (R)	Skin tags (S)	Thrombosis (T)
B0: No bleeding	P0: No prolapse	R0: Spontaneous reduction	S0: No skin tags	T0: No acute thrombosis
B1: Bleeding	P1: 1 prolapsing hemorrhoid P2: 2 prolapsing hemorrhoids	R1: Manual reduction required R2: Irreducible	S1: Symptomatic skin tags	T1: Thrombosis present

1.3.4 BPECT Staging System

The BPECT staging system was proposed by Chen Wenping in 2021 [30]. Similar to BPRST but with different and more detailed assessment items and clearer corresponding treatment modalities (see Table 2), BPECT classifies hemorrhoidal disease into four stages: Stage I (B1+P0, E0, C0, T0) manageable with lifestyle adjustment and office non-surgical treatment; Stage II (B2 or P1+E0, T0+any C) treatable with non-anal canal excision procedures (stapled hemorrhoidopexy, transanal hemorrhoidal dearterialization, etc.) in addition to Stage I methods; Stage III (P2a or E1-2 or T2+any B, C) treatable with anal canal excision or non-anal canal excision combined with external hemorrhoidectomy; Stage IV (P2b+any B, E, C, T) primarily managed with transanal stapled rectal resection, optionally combined with external hemorrhoidectomy. Currently implemented in multiple hospitals nationwide, this staging system lacks prospective or retrospective studies validating its effectiveness and differences from other classification systems.

Table 2 BPECT Classification

Bleeding (B)	Prolapse (P)	External hemorrhoids (E)	Internal hemorrhoid size (C)	Anal sphincter tone (T)
B0: No bleeding	P0: No prolapse	E0: No external hemorrhoids	C0: Single independent internal hemorrhoid with diameter <1/4 anal circumference	T0: Normal anal sphincter tone

Bleeding (B)	Prolapse (P)	External hemorrhoids (E)	Internal hemorrhoid size (C)	Anal sphincter tone (T)
B1: Intermittent, controllable bleeding	P1: Reducible prolapse	E1: Sum of single or multiple external hemorrhoid diameters <1/2 anal circumference	C1: Sum of single or multiple internal hemorrhoid diameters <1/2 anal circumference	T1: Reduced anal sphincter tone (associated with incomplete anal incontinence, decreased sphincter contraction, or reduced resting pressure on manometry)
B2: Continuous spurting, severe bleeding	P2: Severe prolapse	E2: Sum of single or multiple external hemorrhoid diameters 1/2 anal circumference	C2: Sum of single or multiple internal hemorrhoid diameters 1/2 anal circumference	T2: Increased anal sphincter tone (associated with internal anal sphincter spasm or anal fissure)
	P2a: Irreducible internal hemorrhoid prolapse			
	P2b: Any internal hemorrhoid prolapse + anal···			

1.3.5 "Four-Factor" Assessment Protocol for Internal and Mixed Hemorrhoids

Proposed by Zhao Yongchang, Sun Feng, Li Yuying, et al. in 2021, this protocol argues that Goligher classification only assesses the longitudinal axis fea-

ture (prolapse) while neglecting transverse features such as hemorrhoid circumference and omitting external hemorrhoid assessment, failing to accurately reflect disease evolution [31]. The protocol includes assessment items for primary hemorrhoid prolapse degree, bleeding frequency, proportion of primary hemorrhoid occupying the anal circumference, and external hemorrhoid type, with four grades for each item indicating severity. Although the selected assessment items are based on clinical experience and current classification development, representing valuable considerations, the protocol is clinically cumbersome and lacks evidence-based medical support, requiring further optimization.

2. Analysis of Hemorrhoidal Disease Assessment Classifications

2.1 Essential Factors for Hemorrhoidal Disease Assessment Classifications

1) **Objectivity**: The classification must objectively reflect the complete picture of the patient' s hemorrhoidal disease, minimizing inter-observer variability to enable precise assessment and treatment. This involves selecting objective physical signs as assessment items and avoiding patient self-report and questionnaires.

2) **Practicality**: The classification should be simple, operable, and produce positive effects in clinical assessment.

3) **Correlation with Treatment Modalities**: The classification is essential for rational treatment selection, and linking assessment to treatment modalities benefits personalized treatment planning and facilitates evaluation of treatment effectiveness.

4) **Reproducibility**: Different assessors, institutions, regions, or countries should achieve consistent results when evaluating the same population using the same classification. This can be validated through single-center or multicenter prospective or retrospective studies.

2.2 Evaluation Value Analysis and Limitations

Table 3 Advantages, Disadvantages and Evaluation Value of Different Hemorrhoidal Disease Assessment and Classification Methods

Classification	Advantages	Disadvantages	Objectivity	Practicality	Treatment Correlation	Reproducibility	Evaluation Value
Goligher Classification	Simple operation; Wide application	Ignores dynamic evolution; Limited assessment content	Moderate	High	Low	High	Moderate
Indian New Classification	Clear process; Easy operation	Lacks bleeding and internal/external hemorrhoid classification; No evidence-based support	Moderate	High	High	Moderate	Moderate
Prolapse Assessment Algorithm	Quantifies prolapse; Focuses on complications and contraindications	Not associated with treatment modalities; Lacks evidence-based support	High	Moderate	Low	Moderate	Moderate

Classification	Advantages	Disadvantages	Objectivity	Practicality	Treatment Correlation	Reproducibility	Evaluation Value
SPC	Novel; Comprehensive; Focuses on individual hemorrhoids	Cumbersome operation; Not associated with treatment modalities; Lacks evidence-based support	High	Low	Low	Low	Low
Japanese Endoscopic Classification	Novel concept	Non-standard assessment tool; Not recommended by guidelines; Not associated with treatment modalities	Low	Low	Low	Low	Low

Classification	Advantages	Disadvantages	Objectivity	Practicality	Treatment Correlation	Reproducibility	Evaluation Value
Lunniss Classification	Comprehensive; Subdivides non-prolapsing hemorrhoids	Cumbersome operation; Subjective assessment items; Lacks evidence-based support	Low	Low	Low	Low	Low
A/CTC	Comprehensive; Detailed external hemorrhoid types; Notes contraindications	Cumbersome operation; Subjective assessment items; Lacks evidence-based support	Low	Low	Moderate	Low	Low
BPRST	Novel; Comprehensive; Inspired by TNM staging	Not associated with treatment modalities; Lacks evidence-based support	High	Moderate	High	Moderate	Moderate

Classification	Advantages	Disadvantages	Objectivity	Practicality	Treatment Correlation	Reproducibility	Evaluation Value
BPECT	Novel; Comprehensive; Detailed; Clear treatment correlation	Cumbersome operation; Lacks evidence-based support	High	Moderate	High	Moderate	Moderate
PNR-Bleeding	Objective bleeding assessment; Subdivides grade IV; Quantifies bleeding	Not associated with treatment modalities; Lacks evidence-based support	High	Moderate	Low	Moderate	Moderate

Classification	Advantages	Disadvantages	Objectivity	Practicality	Treatment Correlation	Reproducibility	Evaluation Value
Four-Factor Assessment	Subdivides hemorrhoid circumference; Guides stapled hemorrhoidopexy selection	Cumbersome clinical application; Lacks evidence-based support	Moderate	Low	Moderate	Low	Low

Table 3 summarizes the advantages, disadvantages, and evaluation value of various classifications. Common limitations include cumbersome operation, lack of evidence-based medical evidence, absence of treatment modality correlation, and inclusion of subjective assessment items. Notably, seemingly objective items such as bleeding, fecal soiling, discharge, and symptom frequency are often reported by patients or families in clinical practice, raising questions about their objectivity. Some classifications have undergone prospective clinical studies but have not compared inter-observer variability across different centers or addressed potential bias risks. Without demonstrating consistency among different assessors and centers, the clinical reliability and validity of these classifications remain compromised.

2.3 Optimization Strategies

To address these limitations, we propose the following optimization strategies:
1) **Synonymous Replacement**: Replace subjective or questionable assessment items with causally related objective items, such as substituting fecal soiling or discharge with anal sphincter tone assessment.
2) **Computer-Aided Diagnosis (CAD) Integration**: CAD utilizes computer technology to analyze patient data and images for modeling, assisting physicians in diagnosis and treatment selection [32]. Widely applied in screening for breast cancer, lung cancer, and colorectal cancer [33-35], CAD has shown promise in hemorrhoidal disease assessment. A recent study demonstrated that submucosal linear enhancement in computed tomography improves detection of

high-bleeding-risk internal hemorrhoids [36]. Future classifications could integrate CAD to simplify assessment steps, improve efficiency, and enhance practicality.

3. Clinical Application Recommendations

As the pathogenesis of hemorrhoidal disease remains unclear and clinical management focuses primarily on symptomatic treatment, classification systems should follow a symptom/sign-oriented principle, allowing flexible selection based on the patient' s predominant symptoms and signs.

3.1 Distinguishing Conservative vs. Surgical Treatment

The choice between conservative and surgical management is the primary decision facing clinicians. The following classifications can assist in treatment decisions:

- **Prolapse-predominant**: Goligher classification or prolapse assessment algorithm are preferred. Goligher classification, focusing on prolapse, offers wide application, simple operation, and rapid assessment. The prolapse assessment algorithm, essentially Goligher-based but presented as a flowchart, provides clearer process visualization. Other classifications are more cumbersome and should be used selectively.
- **Bleeding-predominant**: PNR-bleeding classification is preferred, followed by BPECT and the four-factor assessment protocol. PNR-bleeding provides detailed assessment of bleeding amount and frequency, while BPECT and the four-factor protocol emphasize bleeding frequency. Conservative treatment is recommended for mild-to-moderate bleeding. Other classifications have less specific bleeding assessment or lack bleeding items altogether and should be used flexibly based on specific circumstances.

3.2.1 Prolapse-Predominant Cases

The Indian new classification is preferred, followed by BPECT or the four-factor assessment protocol. Based on Goligher classification, the Indian system assesses hemorrhoid number and size with corresponding treatment recommendations, offering simple operation and minimal new content to memorize. For patients with significant fecal soiling, discharge, or anal heaviness, BPECT assessment is recommended. The four-factor protocol includes assessment of primary hemorrhoid circumference proportion, guiding stapled hemorrhoidopexy selection; stapled hemorrhoidopexy is recommended when the primary hemorrhoid occupies 3/4 of the anal circumference without anal stenosis for optimal outcomes.

3.2.2 Bleeding-Predominant Cases

PNR-bleeding classification is preferred, followed by the Japanese colonoscopic classification. PNR-bleeding provides detailed bleeding symptom assessment. Sclerotherapy or transanal hemorrhoidal dearterialization is recommended for

severe bleeding. If EBL is considered, the Japanese colonoscopic classification can be used for evaluation.

4. Assessment Items for Hemorrhoidal Disease

Hemorrhoidal disease classifications comprise one or multiple assessment items. Selecting representative items is crucial for accurate disease assessment and appropriate treatment selection. The most frequently appearing items across classifications are prolapse, followed by bleeding, thrombosis, skin tags, and circumference proportion. Historically, *Yixue Gangmu* (Medical Compendium) states: "Any small fleshy protrusion in the nine orifices is called hemorrhoid," where "hemorrhoid" can be understood as prolapse. Western terminology typically refers to internal hemorrhoids characterized by prolapse and bleeding [37]. A retrospective study found that diagnostic accuracy for hemorrhoidal disease was 73% higher in patients with prolapse symptoms (p=0.02) [38], while another study showed bleeding accounted for 47% of initial hemorrhoidal symptoms [39]. A recent genome-wide study by Monash University identified 102 new genomic regions associated with hemorrhoidal disease, primarily expressed in vascular, gastrointestinal tissues, and pathways related to smooth muscle, epithelial, and endothelial development [40]. This suggests hemorrhoidal disease may result from vascular, smooth muscle, epithelial, and connective tissue dysfunction, corresponding to the pathogenesis of prolapse and bleeding. Thus, prolapse and bleeding have historically been primary hemorrhoidal symptoms and should be considered fundamental assessment items. Additional items such as anal sphincter tone and circumference proportion can guide specific surgical maneuvers (e.g., number of ligations, need for sphincterotomy). Future classifications could build upon prolapse and bleeding, with clinicians appropriately adding or omitting other items based on experience and perspectives to enable accurate assessment and precision treatment.

5. Summary and Outlook

Hemorrhoidal disease is a common colorectal disorder whose high incidence and recurrence rates create pressure for both physicians and patients. Objective, effective assessment and appropriate treatment selection remain focal concerns for clinicians. In recent years, scholars worldwide have proposed numerous classification systems, though international consensus has yet to be achieved. Current limitations include suboptimal practicality and lack of correlation with treatment modalities, which should be addressed in future developments. Integration of novel classifications with CAD to streamline assessment processes and improve efficiency represents a promising research direction. Most classifications lack validation through clinical trials, which are essential steps in establishing new assessment systems [41]. Future single-center or multicenter clinical trials should be conducted to validate clinical reliability and validity, preparing for consensus development and widespread adoption. Hemorrhoidal disease assessment is a critical component of clinical practice, with objectivity,

practicality, treatment correlation, and reproducibility as essential factors. The optimization of hemorrhoidal disease assessment classifications remains a long journey requiring concerted efforts from clinicians and researchers.

Conflict of Interest: All authors declare no conflict of interest.

Author Contributions: NI Jiachun was responsible for literature collection, organization, and manuscript writing; NI Jiachun, CAI Zengjin, JIANG Qiong, and FAN Wenbin contributed to conceptualization; HOU Changcheng, KANG Jian, YANG Xiangdong, and FAN Wenbin were responsible for manuscript revision; FAN Wenbin was responsible for quality control, final review, overall supervision, and project administration.

Literature Search Strategy: Computerized searches were conducted in CNKI, Wanfang Data, SinoMed, PubMed, EMBase, the Cochrane Library, and Web of Science from database inception to August 1, 2022. Chinese search terms included hemorrhoid, symptom assessment, and classification; English search terms included hemorrhoid, symptom assessment, and classification.

References: [1] Thomson WH. The nature of haemorrhoids. Br J Surg. 1975;62(7):542-552. doi:10.1002/bjs.1800620710
[2] Loder PB, Kamm MA, Nicholls RJ, et al. Haemorrhoids: pathology, pathophysiology and aetiology. Br J Surg. 1994;81(7):946-954. doi:10.1002/bjs.1800810707
[3] PARKS AG. De haemorrhois; a study in surgical history. Guys Hosp Rep. 1955;104(2):135-156.
[4] Johanson JF, Sonnenberg A. The prevalence of hemorrhoids and chronic constipation. An epidemiologic study. Gastroenterology. 1990;98(2):380-386. doi:10.1016/0016-5085(90)90828-o
[5] Sheikh P, Régnier C, Goron F, et al. The prevalence, characteristics and treatment of hemorrhoidal disease: results of an international web-based survey. J Comp Eff Res. 2020;9(17):1219-1232. doi:10.2217/cer-2020-0159
[6] Riss S, Weiser FA, Schwameis K, et al. The prevalence of hemorrhoids in adults. Int J Colorectal Dis. 2012;27(2):215-220. doi:10.1007/s00384-011-1316-3
[7] Jiang W, Zhang HX, Sui N, et al. Common anorectal diseases among urban residents in China[J]. Chinese Journal of Public Health. 2016,32(10):1293-1296.
[8] Yu T, Xie MN, Chen XH, et al. Study on epidemiological characteristics of hemorrhoidal disease in Jinshan District, Shanghai[J]. Hunan Journal of Traditional Chinese Medicine. 2021,37(04):123-126.
[9] Peery AF, Crockett SD, Murphy CC, et al. Burden and Cost of Gastrointestinal, Liver, and Pancreatic Diseases in the United States: Update 2018 [published correction appears in Gastroenterology. 2019 May;156(6):1936]. Gastroenterology. 2019;156(1):254-272.e11. doi:10.1053/j.gastro.2018.08.063
[10] Yang JY, Peery AF, Lund JL, et al. Burden and Cost of Outpatient Hemorrhoids in the United States Employer-Insured Population, 2014. Am J Gastroenterol. 2019;114(5):798-803. doi:10.14309/ajg.0000000000000143
[11] Cosman BC. Piles of Money: "Hemorrhoids" Are a Billion-Dollar Industry.

Am J Gastroenterol. 2019;114(5):716-717. doi:10.14309/ajg.0000000000000234
[12] Goligher JC. Surgery of the Anus, Rectum and Colon. 4th Edition. London: Ballierè Tindal 1980
[13] van Tol RR, Kleijnen J, Watson AJM, et al. European Society of ColoProctology: guideline for haemorrhoidal disease. Colorectal Dis. 2020;22(6):650-662. doi:10.1111/codi.14975
[14] Davis BR, Lee-Kong SA, Migaly J, et al. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Management of Hemorrhoids. Dis Colon Rectum. 2018;61(3):284-292. doi:10.1097/DCR.0000000000001030
[15] Chinese Guidelines for Diagnosis and Treatment of Hemorrhoids (2020)[J]. Colorectal & Anal Surgery. 2020,26(05):519-533. DOI:10.19668/j.cnki.issn1674-0491.2020.05.001.
[16] Rubbini M, Ascanelli S. Classification and guidelines of hemorrhoidal disease: Present and future. World J Gastrointest Surg. 2019;11(3):117-121. doi:10.4240/wjgs.v11.i3.117
[17] Picciariello A, Tsarkov PV, Papagni V, et al. Classifications and Clinical Assessment of Haemorrhoids: The Proctologist' s Corner. Rev Recent Clin Trials. 2021;16(1):10-16. doi:10.2174/1574887115666200312163940
[18] Dekker L, Han-Geurts IJM, Grossi U, et al. Is the Goligher classification a valid tool in clinical practice and research for hemorrhoidal disease? [published online ahead of print, 2022 Feb 9]. Tech Coloproctol. 2022;10.1007/s10151-022-02591-3. doi:10.1007/s10151-022-02591-3
[19] Agarwal N, Singh K, Sheikh P, et al. Executive Summary - The Association of Colon & Rectal Surgeons of India (ACRSI) Practice Guidelines for the Management of Haemorrhoids-2016. Indian J Surg. 2017;79(1):58-61. doi:10.1007/s12262-016-1578-7
[20] Elbetti C, Giani I, Novelli E, et al. The single pile classification: a new tool for the classification of haemorrhoidal disease and the comparison of treatment results. Updates Surg. 2015;67(4):421-426. doi:10.1007/s13304-015-0333-0
[21] Gerjy R, Lindhoff-Larson A, Nyström PO. Grade of prolapse and symptoms of haemorrhoids are poorly correlated: result of a classification algorithm in 270 patients. Colorectal Dis. 2008;10(7):694-700. doi:10.1111/j.1463-1318.2008.01498.x
[22] Sadahiro S, Mukai M, Tokunaga N, et al. A new method of evaluating hemorrhoids with the retroflexed fiberoptic colonoscope. Gastrointest Endosc. 1998;48(3):272-275. doi:10.1016/s0016-5107(98)70190-7
[23] Fukuda A, Kajiyama T, Kishimoto H, et al. Colonoscopic classification of internal hemorrhoids: usefulness in endoscopic band ligation. J Gastroenterol Hepatol. 2005;20(1):46-50. doi:10.1111/j.1440-1746.2004.03536.x
[24] Yamana T. Japanese Practice Guidelines for Anal Disorders I. Hemorrhoids. J Anus Rectum Colon. 2018;1(3):89-99. Published 2018 May 25. doi:10.23922/jarc.2017-018
[25] Khan MA, Chowdri NA, Parray FQ, et al. "PNR-Bleed" classification and Hemorrhoid Severity Score—a novel attempt at classifying the hemorrhoids [J]. Journal of Coloproctology, 2020, 40(4): 398-403.

[26] Lunniss PJ, Mann CV. Classification of internal haemorrhoids: a discussion paper. Colorectal Dis. 2004;6(4):226-232. doi:10.1111/j.1463-1318.2004.00590.x
[27] Naldini G, Caminati F, Sturiale A, et al. Improvement in Hemorrhoidal Disease Surgery Outcomes Using a New Anatomical/Clinical-Therapeutic Classification (A/CTC). Surg J (N Y). 2020;6(3):e145-e152. Published 2020 Sep 10. doi:10.1055/s-0040-1712542
[28] Sobrado Júnior CW, Obregon CA, E Sousa Júnior AHDS, et al. A New Classification for Hemorrhoidal Disease: The Creation of the "BPRST" Staging and Its Application in Clinical Practice. Ann Coloproctol. 2020;36(4):249-255. doi:10.3393/ac.2020.02.06
[29] Sobrado CW, de Almeida Obregon C, Sobrado LF, et al. The novel BPRST classification for hemorrhoidal disease: A cohort study and an algorithm for treatment. Ann Med Surg (Lond). 2020;61:97-100. Published 2020 Dec 19. doi:10.1016/j.amsu.2020.12.019
[30] Chen WP, Lin WL, Ma QL, et al. Establishment and preliminary application of BPECT staging method for hemorrhoidal disease[J]. Colorectal & Anal Surgery. 2021,27(05):488-492. DOI: 10.19668/j.cnki.issn1674-0491.2021.05.017.
[31] Zhao YC, Liu JJ, Wu XS, et al. Establishment and clinical application value of "four-factor" assessment protocol for internal and mixed hemorrhoids[J]. Colorectal & Anal Surgery. 2021,27(02):152-155. DOI:10.19668/j.cnki.issn1674-0491.2021.02.013.
[32] Chan HP, Hadjiiski LM, Samala RK. Computer-aided diagnosis in the era of deep learning. Med Phys. 2020;47(5):e218-e227. doi:10.1002/mp.13764
[33] Gao Y, Geras KJ, Lewin AA, et al. New Frontiers: An Update on Computer-Aided Diagnosis for Breast Imaging in the Age of Artificial Intelligence [published correction appears in AJR Am J Roentgenol. 2019 Mar;212(3):712]. AJR Am J Roentgenol. 2019;212(2):300-307. doi:10.2214/AJR.18.20392
[34] Park S, Lee SM, Lee KH, et al. Deep learning-based detection system for multiclass lesions on chest radiographs: comparison with observer readings. Eur Radiol. 2020;30(3):1359-1368. doi:10.1007/s00330-019-06532-x
[35] Tokunaga M, Matsumura T, Nankinzan R, et al. Computer-aided diagnosis system using only white-light endoscopy for the prediction of invasion depth in colorectal cancer. Gastrointest Endosc. 2021;93(3):647-653. doi:10.1016/j.gie.2020.07.053
[36] Kisaki S, Igarashi T, Ashida H, et al. The Utility of Submucosal Linear Enhancement on Dynamic Computed Tomography for Patients With Internal Hemorrhoids [published online ahead of print, 2022 May 20]. J Comput Assist Tomogr. 2022;10.1097/RCT.0000000000001338. doi:10.1097/RCT.0000000000001338
[37] Cao B, Li ST, Li Z. Discussion on the concept and classification of hemorrhoids[J]. Chinese Journal of Current Advances in General Surgery. 2009,12(01):69-70.
[38] Idrees JJ, Clapp M, Brady JT, et al. Evaluating the Accuracy of Hemorrhoids: Comparison Among Specialties and Symptoms. Dis Colon Rectum. 2019 Jul;62(7):867-871. doi: 10.1097/DCR.0000000000001315. PMID:
[39] Sheikh P, Régnier C, Goron F, Salmat G. The prevalence, characteristics

and treatment of hemorrhoidal disease: results of an international web-based survey. J Comp Eff Res. 2020;9(17):1219-1232. doi:10.2217/cer-2020-0159
[40] Zheng T, Ellinghaus D, Juzenas S, et al. Genome-wide analysis of 944,133 individuals provides insights into the etiology of haemorrhoidal disease [published online ahead of print, 2021 Apr 22]. Gut. 2021;70(8):1538-1549. doi:10.1136/gutjnl-2020-323868
[41] Rubbini M, Ascanelli S, Fabbian F. Hemorrhoidal disease: is it time for a new classification?. Int J Colorectal Dis. 2018;33(6):831-833. doi: 10.1007/s00384-018-3060-4

Note: Figure translations are in progress. See original paper for figures.