STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No.	Recommendation	Page No.	Relevant text from manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1	Analysis of factors associated with gastrointestinal stromal tumor rupture and pathological risk: a single-center retrospective study
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	1-2	Background: Gastrointestinal stromal tumor (GIST) is a rare gastrointestinal mesenchymal tumor with potential malignancy. Once the tumor ruptures, regardless of tumor size and mitotic number, it can be identified as a high-risk group. It is of great significance for the diagnosis, treatment and prognosis of GIST if non-invasive examination can be performed before surgery to accurately assess the risk of tumor. Aim: To investigate the factors associated with GIST rupture and pathological risk, and provide insights into non-invasive examination techniques and risk assessment for GIST. Methods: A cohort of fifty GIST patients, as confirmed by

postoperative pathology, was selected from our hospital. Clinicopathological and CT data of the patients were collected. Logistic regression analysis was used to evaluate factors associated with GIST rupture and pathological risk grade. Results: Pathological risk grades, tumor diameter, tumor morphology, internal necrosis, gas-liquid interface and Ki-67 expression index exhibited significant associations with GIST rupture ($P<0.05$). Gender, tumor diameter, tumor rupture, and Ki-67 expression index were found to be correlated with pathological risk grades of GIST ($P<0.05$). Multifactorial logistic regression analysis revealed that male gender and tumor diameter ≥10 cm were independent predictors of a high pathological risk grade of GIST (OR=11.12, 95%CI: 1.81-68.52, P=0.01; OR=22.96, 95%CI: 2.19-240.93, P=0.01). Tumor diameter ≥10cm, irregular shape, internal necrosis, gas-liquid interface and Ki-67≥ 10 were identified as independent

				predictors of a high risk of GIST rupture (OR=9.67, 95%CI: 2.15-43.56, P=0.01; OR=35.44, 95%CI: 4.01-313.38, P<0.01; OR=18.75, 95%CI: 3.40-103.34, P<0.01; OR=27.00, 95%CI: 3.10-235.02, P<0.01; OR=4.43, 95%CI: 1.10-17.92, P=0.04). Conclusion: Tumor diameter, tumor morphology, internal necrosis and gas-liquid interface and Ki-67 are associated with GIST rupture, while gender and tumor diameter are linked to the pathological risk of GIST. These findings contribute to our understanding of GIST and may inform non-invasive examination strategies and risk assessment for this condition.
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2-3	Gastrointestinal stromal tumor (GIST), a rare mesenchymal tumor of the gastrointestinal tract, presents a potential for malignancy and constitutes 1%-3% of gastrointestinal malignancies[1, 2]. Immunohistochemical analysis of GIST typically reveals

positive expression of CD117, CD34, or DOG-1[3, 4]. Due to its invasive nature, propensity for recurrence and metastasis, the clinical assessment of invasive prognosis following GIST surgery heavily relies on pathological evaluation. However, preoperative selection of appropriate treatment methods lacks a foundation based on pathological assessment. Notably, imaging characteristics of GIST have been observed, and significant disparities in postoperative pathological risk grading have been identified between GISTs exhibiting distinct CT features prior to surgery, thereby highlighting the crucial role of CT in GIST diagnosis[5, 6]. GISTs display unpredictable and variable biological behavior, rendering the distinction between benign and malignant tumors challenging[2, 7]. In the early stages, GISTs were classified as either benign or malignant; however, clinical experience has revealed that tumors initially determined as

"benign" by histopathology may later metastasize. Consequently, many pathologists advocate for grouping based on pathological risk grades[8, 9]. Once the tumor ruptures, irrespective of size and mitotic count, it can be classified as a high-risk group. Biopsy samples of GISTs are limited and inconvenient, and open biopsies can potentially induce tumor metastasis, precluding risk assessment in such cases. Risk assessment cannot be performed for biopsied cases. Therefore, needle biopsy is not recommended prior to surgery for GISTs that can be completely resected [10]. Given the divergent treatment and prognosis of GISTs compared to non-epithelial tumors like lymphoma and schwannoma, preoperative imaging diagnosis and evaluation assume paramount importance. The ability to perform non-invasive examinations before surgery to accurately assess tumor risk would hold significant implications for GIST

				diagnosis, treatment, and prognosis.
Objectives	3	State specific objectives, including any prespecified hypotheses	3	In light of this, we postulate that imaging findings possess clinical utility in predicting GIST rupture and pathological risk. Consequently, this study offers insights into non-invasive examination strategies and risk assessment for GIST by examining the correlation between imaging findings and GIST rupture and pathological risk.
Methods				
Study design	4	Present key elements of study design early in the paper	1	A cohort of fifty GIST patients, as confirmed by postoperative pathology, was selected from our hospital. Clinicopathological and CT data of the patients were collected. Logistic regression analysis was used to evaluate factors associated with GIST rupture and pathological risk grade.
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3	Fifty patients diagnosed with GIST between January 2020 and July 2023 were included in this retrospective study, following confirmation of the diagnosis through postoperative

				pathology at our institution.
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	3	Fifty patients diagnosed with GIST were included in this retrospective study, following confirmation of the diagnosis through postoperative pathology at our institution. The patients' clinicopathological and computed tomography (CT) data were systematically collected. The study cohort consisted of individuals aged between 18 and 84 years, comprising 28 males and 22 females. In order to ensure the reliability and relevance of the data, specific inclusion and exclusion criteria were applied. The inclusion criteria encompassed patients who had undergone biopsy or surgery at our hospital, with complete and well-documented pathological data, clear risk grading, and comprehensive clinical and CT data available. Furthermore, only primary tumors were considered, while patients who had not undergone CT examination prior to surgery, or whose CT image quality was deemed inadequate, were

				excluded. Additionally, cases with uncertain tumor pathological risk grading or those involving tumor relapse were also excluded from the study cohort.
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case		
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	3-4	In this investigation, we meticulously gathered a comprehensive set of clinical and pathological data from a cohort of 50 patients diagnosed with gastrointestinal stromal tumors (GIST). The dataset encompassed crucial patient demographics such as age and gender, as well as pivotal pathological indicators including risk grades, tumor diameter, morphology, necrosis, rupture status, gas-liquid interface, tumor location, mitotic figures, and Ki-67 expression index.
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	4-5	The enhanced CT scanning was performed using a 256-slice computed tomography scanner (Brilliance iCT, Philips) with

	the following scanning conditions: peak kilovoltage (KV) of 120 and tube current (ma) ranging from 138 to 458. The following parameters were assessed: (1) Tumor diameter: The maximum diameter of the tumor was measured on the coronal image. (2) Tumor morphology: The shape of the tumor was evaluated to determine if it exhibited a regular shape. A tumor with an elliptical or round shape was considered regular. (3) Boundary: The boundary of the tumor was assessed based on the presence of a clear boundary or an unclear boundary. An unclear boundary indicated a potential for invasion. (4) Primary tumor site: The primary tumor site was determined based on the location of the initial lesion. (5) Necrosis: The presence of a necrotic area was determined based on the CT results. (6) Gas-liquid interface: The presence of a gas-liquid interface was assessed based on the imaging results. These parameters were evaluated to

			assess the risk factors associated with GIST rupture and pathological risk. 1.4 Criteria for tumor rupture[12, 13] (1) Tumor rupture or overflow; (2) There is bloody ascites; (3) Gastrointestinal perforation at the tumor site; (4) Microscopic infiltration of adjacent organs; (5) Intra-lesional dissection or segmental resection; (6) Iincisional biopsy.
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	

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Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why		
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	5	SPSS 26.0 (IBM Corp, Armonk, NY) software was used for statistical analysis. Enumeration data were expressed as frequency, and statistical analysis was performed by χ^2 test. Pearson correlation was used to analyze the correlation between age, gender, pathological risk grades, tumor diameter, tumor morphology, internal necrosis, tumor rupture, gas-liquid interface, tumor site, mitotic figures, Ki-67 expression index. P<0.05 means the difference was statistically significant.
		(*b*) Describe any methods used to examine subgroups and interactions		
		(*c*) Explain how missing data were addressed		
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy		
		(*e*) Describe any sensitivity analyses		
Results				
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	3	Section 1.1
		(b) Give reasons for non-participation at each stage	3	Section 1.1
		(c) Consider use of a flow diagram	3	Section 1.1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	5-6	Table 1

		(b) Indicate number of participants with missing data for each variable of interest		
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)		
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time		
		Case-control study—Report numbers in each exposure category, or summary measures of exposure		
		Cross-sectional study—Report numbers of outcome events or summary measures	6	The results showed that there were 24 cases of low risk, 6 cases of intermediate risk, and 20 cases of high risk.
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-10	Table 3 and Table 4
		(*b*) Report category boundaries when continuous variables were categorized		
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period		

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Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	9-10	Table 3 and Table 4
Discussion				
Key results	18	Summarise key results with reference to study objectives	10	First paragraph
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	12	Last paragraph
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-12	The 2th, 3rd, 4th paragraph
Generalisability	21	Discuss the generalisability (external validity) of the study results	10-12	The 2th, 3rd, 4th paragraph
Other information				
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12	This study received no funding support.

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.