SYSTEMATIC REVIEW

Rectal prolapse as an initial presentation of colorectal cancer: a systematic review

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Abstract

Background Colorectal cancer rising incidence still pose a public health challenge. In the present systematic review, we aimed to study the colorectal cancer patients with initial presentation of rectal prolapse.

Method The study protocol was developed (PROSPERO CRD42017060473). We searched Web of Science, PubMed and Scopus to identify case reports of rectal Prolapse as a chief compliant of colorectal cancer. The Preferred Reporting Items for Systematic Reviews and Meta- Analysis (PRISMA) guidelines were used for screening and data extraction.

Results Thirty-one case reports were included in this review. More than half of the patients were females over 65 years old and mean ± SD age of the cases were 64 ± 17.9 years and, the female gender were mentioned in 17 (56%) case reports. The majority (64.5%) of the identified cancer belong to rectum and recto-sigmoid origin's location. In the history retained from the cases, rectal bleeding and constipation were the most frequent reported accompanied symptoms in colorectal cancer cases with initial presentation of rectal prolapse. 67.7% of all identified cases in this review published at 2015 and later.

Conclusion Rectal prolapse can be an initial presentation of colorectal cancer, which is more prevalent in female more than 65 years old. The most common symptoms accompanied rectal prolapse were rectal bleeding and constipation. According to rising published case reports on colorectal cancer patients with initial presentation of rectal prolapse in recent years, further work-up is recommended for patients without predisposing factors for a concomitant tumor.

Keywords Rectal prolapse, Colorectal cancer, Initial presentation, Systematic review

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Introduction

Colorectal cancer (CRC) is 10% of global cancer incidence and 9.4% of cancer deaths. Although the prospect for CRC therapy is generally good, the increasing number of CRC cases and rising incidence still pose a public health challenge. CRC diagnosis at an early stage, allows clinicians to have a golden option to choose the appropriate treatment procedures which leads to a decrease in the disease burden including complications and costs as well as an improvement in survival rates of patients [1, 2]. Therefore, it is crucial to recognize the signs and symptoms to refer the patient for colorectal cancer screening or examinations. Preventing complications, improving survival rates, and minimizing loss of quality of life can be achieved through early symptoms diagnosis [3, 4].

Benign colorectal disorders such as rectal prolapse, hemorrhoids, etc. should be considered as alarm signs for colorectal cancer [5–7]. Rectal prolapse, or procidentia, is a rectal protrusion beyond the anus, with an incidence of 0.25% [8, 9]. Although combination of rectal prolapse with colorectal cancer is uncommon, several studies have reported cases of the association between rectal prolapse as the chief complaint and later colorectal malignancy detection [10–13], and a very brief review of the literature has been published so far. Accordingly, it seems that there is a gap in the literature for a systematic review that summarizes these rare cases extracted from different studies. In the present study, we aimed to review the rectal prolapse cases diagnosed with CRC systematically as well as their characteristics.

Methods

We performed a systematic review based on Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines [14]. The study protocol was registered in the International prospective register of systematic reviews (PROSPERO) with ID: CRD42024533327.

Data source and search strategy

In June 2024, we searched the electronic databases of Web of Science, PubMed, and Scopus, to identify case reports of patients with rectal prolapse as an initial presentation of colorectal cancer. Employing a combination of subject headings that incorporate "Rectal prolapse" AND "Colorectal cancer" (See supplementary File 1. For observation of complete search strategy in three databases). We conducted a thorough manual review of all references extracted from the aforementioned selected studies to identify additional potentially eligible studies. Endnote version 20 was handled for articles management (Organization, categorization and elimination of duplicates).

Study selection

All case reports without language and time restriction reporting the patient presented with the initial complaint of rectal prolapse and then was diagnosed with colorectal cancer in further diagnostic procedures were included in this review. The definition of colorectal cancer in this study was considered all pathologically malignant originated from colon or rectum. Studies with the following criteria were excluded: not-available abstract, cases with tumors protruding from the anus and pervious colorectal cancer diagnosis in patient. After removing duplicated articles, two independent reviewers were performed the initial title and abstract screening of all retrieved articles. Any discrepancies were resolved after reaching a consensus or by consulting a third reviewer. In the case of similar articles with the same authors, the latest published articles were included in the study. Data tabulation and extraction were performed by two reviewers, and any discrepancies were solved by further discussion and rechecking with other authors. All papers selected for inclusion in the systematic review (that is- those that meet the inclusion criteria) was assessed the methodological quality of a study and determined the extent to which a study has addressed the possibility of bias in its design, conduct and analysis. This evaluation by JBI (The Joanna Briggs Institute) critical appraisal tools for case reports and one critical appraiser was performed [15] (Supplementary File 2).

Data extraction

Quantitative normal variables were reported as mean ± standard deviation (SD) and non-normal variables were described as median (Inter-quartile range: IQR). Categorical characteristics were also expressed in frequency (percentage). Results presented according to PRISMA recommendations. The flow diagram summarized the number of articles remained at each screening stage and provided the reasons for exclusion (Fig. 1). The following variables were extracted: first author name, publication year, age, gender, tumor location, tumor type, pathology findings, accompanied symptoms, and past medical history.

Results

In total, 834 records were found in three databases. After removing duplicate articles, 722 studies were initially included for screening titles and abstracts; of these 688 were excluded and 34 studies were included for full-text screening. The full-text of 6 studies were not found and their abstract information were not enough to include this study. In the end, 31 studies were included in the systematic review (28 studies from databases and 3 studies from other methods) (Fig. 1). Demographic and clinical characteristics of eligible cases were summarized at



Fig. 1 Flowchart of the study selection process

Table 1. In consideration of descriptive characteristics, more than half of the patients over 65 years old and the mean \pm SD age of the cases was 64 ± 17.9 years and, the female gender was mentioned in 17 (56%) case reports. Patients were categorized into three groups according to the origin of the identified cancer, which included 14 patients (45%) with rectal origin, 11 patients (36%) with sigmoid origin, and 6 patients (19%) with recto-sigmoid origin of the cancers. No trends were observed in the past medical history of the patients. However, anemia, hypertension, dementia, diverticulitis, gastric ulcer, cardiovascular disease, chronic respiratory disease with frequency of 3(9.7%), 2(6.4%), 1(3.2%), 1(3.2%), 1(3.2%), 2(6.4%), 3(9.7%) were reported, respectively. In the history retained from the cases, the frequency of reported accompanied symptoms with rectal prolapse were illustrated in Fig. 2. As can be seen in Fig. 2., rectal bleeding and constipation were the most frequent reported accompanied symptoms in colorectal cancer cases with initial presentation of rectal prolapse.

In this systematic review, after work-up process in these case reports, it was found that tumor type for 87.1% of all cases were adenocarcinoma. Gastrointestinal stromal tumor, non-Hodgkin's lymphoma, and stromal leiomyosarcoma account for 6.4%, 3.2% and 3.2% of tumor types of cases, respectively.

According to the extracted case, it has been observed that in recent years the abundance of colorectal cancer cases with initial presentation of rectal prolapse has been increasing. 67.7% of all cases in this review were identified in 2015 and later. Trend of publication year for all case reports in our review were demonstrated in Fig. 3. These reports were presented according to region of article publication (Fig. 4)

Discussion

Since 1986, the relationship between rectal prolapse and intra-abdominal pathology has been discussed. Different hypotheses were also proposed for this issue. For instance, colonic pathology can cause chronic constipation followed by partial intestinal obstructions which leads to excessive straining and subsequent increase in intra-abdominal pressure, which results in rectal prolapse [16]. Herein, we intend to describe the characteristics of thirty-one rare cases of rectal prolapse that are associated with CRC.

Rectal prolapse secondary to colorectal cancer in children

The rate of children with rectal prolapse secondary to colorectal cancer was about 3% compared to adults, in this systematic review. Although rectal prolapse is uncommon in children, since 1988 several articles have been published on risk factors, disease management, and

Table 1 Demographic and clinical characteristics of eligible cases in our systematic review

	1st author, publi- cation year	Tumor location	Num- ber of cases	Age[year], Gender	Accompanied Symptoms reported at retained history	Pathology finding Tumor type	Past medical history
1	Tsai T, 2024 [45]	Sigmoid	1	64, Female	Rectal bleeding/Constipation	Adenocarcinoma	None
2	Hasnaoui A, 2023 [46]	Sigmoid-rectal	1	78, Not mentioned	Abdominal pain/Constipation/ Hematochezia	Adenocarcinoma	None
3	Ganesan S, 2023 [47]	Rectum	1	69, Male	Lower abdominal pain/Lower gastroin- testinal bleeding/ Obstruction	Adenocarcinoma	None
4	Penton AA, 2023 [10]	Sigmoid	1	middle- aged, Male	None	Adenocarcinoma	None
5	Sseruwagi TM, 2023 [11]	Rectum	1	60, Male	Fecal incontinence	Adenocarcinoma	None
6	Perrakis A, 2023 [12]	Rectum/sigmoid	1	69, Female	Not clear mentioned	Adenocarcinoma	Not clear mentioned
7	Jurić O, 2023 [13]	Rectum	1	63, Female	Diarrhea/Fatigue after hiking	Adenocarcinoma	Hypertension
8	Marcelis S, 2021 [48]	Rectum	1	78, Female	Constipation/Anal blood loss	Adenocarcinoma	Not clear mentioned
9	Mazumdar P, 2021 [49]	Sigmoid	1	52, Male	Acute colicky abdominal pain/Consti- pation/ large bowel obstruction	Adenocarcinoma	Not clear mentioned
10	Enomoto M, 2021 [50]	Sigmoid	1	26, Female	Severe anal pain after the intestinal tract prolapsed	Adenocarcinoma	None
11	Erdogan O, 2020 [51]	Rectum	1	79, Male	Hemorrhagic mass/Constipation/ weight loss	Gastrointestinal stromal tumor	COPD/ chronic heart failure
12	Scheidbach H, 2020 [7]	Rectum	1	69, Female	Not clear mentioned	Adenocarcinoma	Not clear mentioned
13	Naik AS, 2020 [34]	Rectum	1	52, Male	Rectal bleeding/Constipation with straining during defecation/ Loss of appetite	Adenocarcinoma	None
14	Filiberto AC, 2019 [52]	Rectosigmoid	1	82, Female	Rectal bleeding/ Fecal incontinence/ Weight loss	Adenocarcinoma	Dementia
15	Montwedi D, 2019[53]	Rectosigmoid junction	1	34, Male	Constipation/Intermittent red rectal bleeding	Adenocarcinoma	None
16	Chiong C, 2019 [54]	Sigmoid	1	82, Female	Unintentional Weight loss/ Hematochezia	Adenocarcinoma	Diverticular disease
17	Akyuz M, 2019 [55]	Sigmoid	1	77, Male	Chronic constipation	Adenocarcinoma	None
18	Yamamoto R, 2018[<mark>37</mark>]	Lower rectum	1	63, Female	Rectal bleeding	Adenocarcinoma	Anemia
19	Toyoda S, 2018 [56]	Sigmoid	1	86, Male	Hematochezia/Abdominal pain	Adenocarcinoma	None
20	Tümörü RP, 2016 [57]	Rectosigmoid	1	71, Male	Not clear mentioned	Adenocarcinoma	Not clear mentioned
21	Nabi H, 2015 [<mark>58</mark>]	Rectum	1	77, Female	None	Adenocarcinoma	Cardiorespira- tory disease
22	Nonaka, T, 2011 [59]	Rectum	1	69, Male	Lower abdominal pain/Constipation	Adenocarcinoma	Hypertension and gastric ulcer
23	Ochiai H, 2010 [60]	Sigmoid	1	47, Female	Abdominal pain	Adenocarcinoma	Not clear mentioned
24	Manouras A, 2009 [61]	Rectum	1of 5	68, Female	Rectal bleeding/ Long-standing constipation	Gastrointestinal stromal tumor	Not clear mentioned
25	Chen CY, 2009 [21]	Lower rectum	1	12, Boy	Rectal bleeding	Non-Hodgkin's lymphoma	None
26	McNicol FJ, 2008 [39]	Rectum/ sigmoid	1	72, Female	None	Adenocarcinoma	Not clear mentioned
27	Chen CW, 2008 [62]	Sigmoid	1	75, Female	Obstruction	Adenocarcinoma	COPD
28	Hussain D, 2007 [38]	Rectum	1	36, Male	Rectal bleeding/ pain	Stromal leiomyosarcoma	None

1st author, publi-**Tumor location** Pathology finding Past medical Num-Age[year], Accompanied cation year ber of Gender Symptoms reported at retained Tumor type history cases history 29 Bounovas A, 2007 Sigmoid 85, Female Constipation Adenocarcinoma Anemia 1 [40] Erikoğlu M, 2004 30 Rectum 1 63, Female Constipation/Mucous discharge/Rectal Adenocarcinoma Anemia [63] bleeding/ Fatigue Yamazaki T, 1999 Sigmoid 1 76, Female Constipation Adenocarcinoma Stillbirth 31 [41] COPD: Chronic obstructive pulmonary disease 1 Loss of Appetite 1 Diarrhea Fatigue 2 2 Obstruction **Fecal Incontinence** 2 Weight Loss 3 Anal or Abdominal Pain 8 13 Constipation 14 **Rectal Bleeding** 5 10 0 15

Table 1 (continued)

Fig. 2 The accompanied symptoms reported in history retained from patients

characteristics of children with the clinical condition of rectal prolapse [17–19]. Recently, in a retrospective study on 158 children who were diagnosed with rectal prolapse, with the mean age of onset being 3 years, Cares et al. showed that constipation was the leading cause, with straining being the most common complaint in these children. In addition, this study revealed the changes in characteristics of children's rectal prolapse in recent decades [20].

In 2009, a non-Hodgkin's lymphoma of the lower rectal tumor was presented in a case report of a twelve-year-old boy with rectal prolapse initial presentation and complaint of rectal bleeding [21]. This case report was eligible for including in our review. In 2014, two children in an original article's cases were diagnosed with rectal prolapse and colorectal adenocarcinoma with Duke stage A [22]. Hence, rectal prolapse as an initial presentation of malignancy was reported even in children. Based on these reports, although it is rare, it seems that the possibility of malignancy in children with rectal prolapse should not be ignored.

Gender issues in the association of rectal prolapse secondary to colorectal cancer

Females account for the majority of rectal prolapse incidences [23]. The laxity or weakness of the pelvic floor muscles has been hypothesized to be the cause of rectal prolapse for decades. Female pelvic floor laxity can be the result of childbearing. Nevertheless, 50% of females with rectal prolapse are nulliparous and this hypothesis is not responsible for the incidence of rectal prolapse in men. The role of psychiatric disorders in the occurrence of rectal prolapse has also been suggested [24]. It is also hypothesized that the prostate acts as a powerful anchor for the pelvic organs. However, the difference in frequency of rectal prolapse between sexes has not been



Fig. 3 Trend of publication year for all case reports in our review with linear forecast trend line



Fig. 4 Region of articles publication for all case reports in our review

attributed to a specific cause to date [25]. In our systematic review, 56% of all cases were females. Despite the higher prevalence of rectal prolapse in women than men in other studies compared to our study, it should be noted that in the present study, the cases of rectal prolapse related to colorectal malignancies were considered, and males were at higher risk of CRC incidence than females generally [26, 27]. This issue can be the reason for the relatively high percentage of males with rectal prolapse related to malignancy.

Accompanied symptoms

This study showed the most important symptoms accompanied rectal prolapse were rectal bleeding and constipation. Rectal prolapse is often accompanied by the symptoms of fecal incontinence (50–75% prevalence), rectal bleeding (75-100% prevalence), constipation (25–50% prevalence), etc [28]. These lower gastrointestinal symptoms overlap with CRC condition symptoms. Several studies have evaluated the usefulness of symptoms for the diagnosis of CRC and stated that single signs and symptoms have low sensitivity and specificity for the diagnosis of CRC. However, according to guidelines, in practice, patients with multiple or single bowel symptoms are referred for colonoscopy. Moreover, some studies suggested the possibility of enhancing the sensitivity and specificity of the simultaneous occurrence of several symptoms for CRC diagnosis [29-32]. Although the patients mentioned in our review were presented with the main complaint (initial presentation) of rectal prolapse, they had also other symptoms in their history. Therefore, it is necessary to consider retaining history from patients.

Intussusception, an uncommon presentation of rectal prolapse

Intussusception is a term used to describe when a part of the intestine moves into another part of the intestine. Although intussusception is a common condition in children, this condition is uncommon among adults and accounts for less than 5% of all cases of intussusception. Colorectal malignancy with initial presentation of intussusception protruding through the anal canal is rare. However, if this is misdiagnosed as benign rectal prolapse, it can be life-threatening [33–35]. Unlike children, intussusception in adults is often associated with a pathological lead point, and about 57% of reported cases were attributed to a malignant tumor [36]. Therefore, surgeons should be aware that misdiagnosis of long-standing rectal prolapse instead of sigmoido-rectal intussusception through the anal canal will have serious complications [34]. In our review, we found that 19.3% of the reported cases were sigmoido-rectal intussusception protruding through the anal canal.

Tumor location

According to the literature, proximity might be the cause of prolapse through the anal canal in tumors that are situated in the rectum [37, 38]. Tumors that are located above the rectum may cause rectal prolapse due to intus-susception [39–41]. In our systematic review, rectum and recto-sigmoid tumor account for 64.5% of all cases.

In vivo studies on the association of rectal prolapse with CRC

In 2016, to establish a murine model for investigation of rectal prolapse presentation of CRC, Tommelein et al. conducted an in vivo study using orthotopic intra-caecal xenografts of CRC cells in immunodeficient mice [42]. Although this method is a widely used approach for the

study of human CRC progression and preclinical evaluation of therapeutics, they were the first to describe an association between orthotopic intra-caecal xenografts of CRC cells and rectal prolapse in animal models. Various human CRC cell lines such as HCT-116, SW-620, DLD-1, or HCT-8/E11 and HT29 were intra-caecally injected in immunodeficient mice aged from 4 weeks until 12 weeks in previous literature. However, no rectal prolapse was reported. Tommelein et al. observed that in contrast to adult mice, young mice were susceptible to rectal prolapse when COLO320DM cells (a non-invasive tumor cell line) were present. This result was in accordance with the reports which revealed that in children, rectal prolapse is usually diagnosed by the age of 3 years [43, 44]. Generally, Tommelein et al. found that rectal prolapse in the murine model of CRC may be caused by a combination of the anatomy of young mice, the non-invasive type of tumor, and the young environment [42].

Strengths and limitations

This is the first systematic review to summarize the available literature on rectal prolapse as an initial presentation of colorectal cancer. Nevertheless, the lack of study on the influence of tumor types, tumor staging, age at diagnosis, sex, etc. on the initial presentation of colorectal cancer was the limitation of this review. Thus, a definitive conclusion cannot be drawn in risk factors associated with rectal prolapse as a manifestation of colorectal cancer.

Conclusion

In conclusion, this review emphasizes that rectal prolapse has the potential to be the initial symptom of CRC and it can also be the presenting aspect of unrecognized intra-abdominal pathology. Hence, further workup and adequate investigation such as colonoscopy is recommended for patients with rectal prolapse without predisposing factors for a concomitant tumor.

Supplementary Information

The online version contains supplementary material available at https://doi.or g/10.1186/s12885-025-13924-4.

Supplementary Material 1

Supplementary Material 2

Acknowledgements

Not applicable.

Author contributions

F.S. designed the project; A.A., M.Z. and D.Z. searched databases and performed literature review; D.Z. and F.S. extracted and analyzed the data; M.A. evaluated the quality of included literature; M.A., E.D-M and E.R. contributed to writing the manuscript. Final draft was approved by all the authors.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

The study was performed in accordance with the Declaration of Helsinki. Mashhad University of Medical Sciences Ethical Committee has waived the informed consent due to the lack of an original data set.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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