World Journal of Gastrointestinal Oncology

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DOI: 10.4251/wjgo.v8.i7.550

World J Gastrointest Oncol 2016 July 15; 8(7): 550-554
ISSN 1948-5204 (online)

ORIGINAL ARTICLE

Retrospective Study

Management of colorectal neoplasia during pregnancy and in the postpartum period

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Author contributions: Aytac E and Isik O collected and analyzed the data; Aytac E and Ozuner G drafted the manuscript; Stocchi L provided analytical oversight; Ozuner G, Aytac E and Gorgun E designed and supervised the study; Aytac E, Ozuner G, Isik O, Gorgun E and Stocchi L revised the manuscript for important intellectual content; Aytac E and Ozuner G offered the technical or material support; Ozuner G and Gorgun E provided administrative support; all authors have read and approved the final version to be published.

Institutional review board statement: Approved by the institutional review board.

Informed consent statement: A waiver of consent was obtained from the Institutional Review Board.

Conflict-of-interest statement: The authors declare that they have no conflict of interest.

Data sharing statement: The study team used the data only.

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Received: January 4, 2016
Peer-review started: January 4, 2016
First decision: February 1, 2016
Revised: March 9, 2016
Accepted: April 20, 2016
Article in press: April 22, 2016
Published online: July 15, 2016

Abstract

AIM: To report our experience on management of colorectal neoplasia during pregnancy and in the postpartum period.

METHODS: Patients who were diagnosed with colorectal cancer during pregnancy or in the postpartum period (< 6 mo), between 8/1997 and 4/2013, in our department were reviewed. Patient characteristics, operations, fetal health and follow-up during pregnancy, type of delivery and oncologic outcomes were analyzed.

RESULTS: Eight patients met our study criteria. Median age at the time of diagnosis of colorectal cancer was 31 years. Median follow-up after surgery was 36 mo. Median duration of symptoms before diagnosis was 16 wk. Three patients were diagnosed with colorectal cancer during pregnancy and underwent surgery prior to delivery. None of the patients received adjuvant treatment during pregnancy. Five patients were diagnosed with colorectal cancer within a median of 2.1 mo after delivery and underwent surgery. No adverse neonatal outcomes were noted. All deliveries were at term (2 cesarean sections) except for one preterm delivery following low anterior resection on the 34th week of pregnancy.

CONCLUSION: There has been a significant delay in the diagnosis of colorectal cancer which is probably due to overlap of symptoms and signs between these tumors and a normal pregnancy. Surgery for colorectal cancer during pregnancy can be performed safely without compromising

maternal and fetal outcomes.

Key words: Colorectal cancer; Pregnancy; Postpartum; Neoplasia

Core tip: This paper summarizes the experience of a tertiary referral colorectal center in the United States on the management of colorectal neoplasia during the pregnancy and postpartum period. Eight patients who were diagnosed with colorectal cancer during pregnancy or in the postpartum period between 8/1997 and 4/2013 were reviewed. No maternal and neonatal mortality occurred related to surgical treatment. While surgery for colorectal cancer during pregnancy can be performed safely and may not affect maternal and fetal outcomes adversely, there has been a significant delay in the diagnosis of colorectal cancer which is probably due to overlap of symptoms and signs between these tumors and a normal pregnancy.

Aytac E, Ozuner G, Isik O, Gorgun E, Stocchi L. Management of colorectal neoplasia during pregnancy and in the postpartum period. *World J Gastrointest Oncol* 2016; 8(7): 550-554 Available from: URL: http://www.wjgnet.com/1948-5204/full/v8/i7/550.htm DOI: http://dx.doi.org/10.4251/wjgo.v8.i7.550

INTRODUCTION

While the incidence of colorectal cancer is steady or falling, some studies report an increased incidence of colorectal cancer in younger patients (< 40 years)[1], which may occur during the reproductive age and therefore interfere with pregnancy. Around 0.1% of pregnant women develop a malignancy and there is limited experience on the management of colorectal cancer diagnosed during pregnancy or in the postpartum period[2]. When colorectal cancer is detected in this period, treatment options may be limited. As two patients with possibly conflicting interests need to be managed, many ethical, psycho emotional and medical issues need to be simultaneously addressed. In this study, we analyzed management, complications, maternal and fetal outcomes in patients who were diagnosed with colorectal cancer during pregnancy or in the immediate postpartum period.

MATERIALS AND METHODS

After obtaining the institutional review board approval (IRB), patients who were diagnosed with colorectal cancer during pregnancy or in the postpartum period and treated at the Department of Colorectal Surgery Cleveland Clinic Ohio, from August 1997 to April 2013, were analyzed in the study. The postpartum period is defined as first 6 mo after delivery[3]. Patient characteristics, cancer follow-up, history of previous pregnancies, medications used during pregnancy, indication for surgery, operations performed, outcomes after surgery, complications, maternal and fetal morbidity and mortality during perinatal period and type of delivery were analyzed. Data were retrieved from the IRB approved prospectively maintained databases with supplemental information from patient charts. A multidisciplinary team including gastroenterologists, oncologists, obstetricians and colorectal surgeons followed up all patients.

Quantitative data were reported as median (range) and categorical data as numbers.

RESULTS

Eight patients met our study criteria. Median age at the time of diagnosis of colorectal cancer was 31 (24-38) and median body mass index was 24 (19-27) kg/m^2. Median follow-up after surgery was 36 mo (0.2-192). Two patients had a family history of hereditary non-polyposis colorectal cancer and one had juvenile polyposis syndrome. Four patients were nulliparous, the remaining 4 patients had a history of previous successful pregnancies. The presenting symptoms, duration of symptoms, tumor location and treatment strategy are listed in the Table 1. Median duration of symptoms before diagnosis was 16 (4-43) wk. Three patients were diagnosed with colorectal cancer during pregnancy and underwent surgery prior to delivery. These cases included 1 anterior resection with an end colostomy in the 18th week, 1 low anterior resection in the 24th week and 1 subtotal colectomy during the 8th week of pregnancy. Five patients were diagnosed with colorectal cancer within a median of 2.1 (1-4.2) mo after delivery. One synchronous low anterior resection and liver resection, 1 extensive left colectomy, 1 transanal resection, 1 ileocecal resection, and 1 right colectomy were performed on those patients. No adverse neonatal outcomes were noted. All deliveries were at term, except for one patient who underwent low anterior resection during pregnancy (34th week) and delivered preterm. Two patients underwent a cesarean section. Median APGAR score was 9 (8-9). Median birth weight was 3100 (3000-3800) g.

Adjuvant or neoadjuvant treatments were administered exclusively after delivery. In particular, one patient received neoadjuvant chemoradiotherapy whereas adjuvant chemotherapy was given to 5 patients. The specific chemotherapeutic regimens were 5-florouracil with leucovorin (n = 2), FOLFOX (n = 2) and FOLFIRI (n = 1). In long-term follow-up, two patients had further successful pregnancies. One of these patients had a ventral hernia repair. The patient initially treated with transanal excision of a T1 rectal lesion opted in favor of radical surgery after delivery and underwent low anterior resection.

DISCUSSION

Our study shows that surgical intervention can be safe and feasible in patients who are diagnosed with

Table 1 Treatment strategy and patient status at last follow-up

	Stage	Start of symptom (pregnancy week)	Duration of symptoms until diagnosis (wk)	Symptom	Tumor location	NCRT	Postoperative chemotherapy	Postoperative radiotherapy	Status at last follow-up
1[1,2]	I	4	10	Rectal bleeding	Sigmoid colon	-	-	-	Alive (NED)
2[1,2]	III	13	4	Rectal bleeding	Rectum	-	+	-	Alive (NED)
3[1,2]	III	16	7	Rectal bleeding	Rectum	-	+	-	Alive (NED)
4[1,3]	I	36	17	Rectal bleeding	Rectum	-	-	-	Alive (NED)
5[1,3]	III	34	14	Abdominal pain	Right colon	-	-	-	Alive (NED)
6[1,3]	III	20	24	Rectal bleeding	Rectum	-	+	-	Alive (NED)
7[1,3]	IV	30	17	Rectal bleeding	Rectum	+	+	-	Deceased[4]
8[3]	IV	12	43	Anemia, abdominal pain	Right colon	-	+	-	Deceased

[1]Curative surgery; [2]Diagnosed during pregnancy; [3]Diagnosed after pregnancy; [4]Recurrent disease. NCRT: Neoadjuvant chemoradio therapy; NED: No evidence of disease.

colorectal cancer during pregnancy or in the postpartum period. All of our patients who were diagnosed with colorectal cancer after delivery, had symptoms during pregnancy. Normal pregnancy can mask the symptoms and signs associated with colorectal malignancy[2,4,5]. For example, abdominal pain, intermittent rectal bleeding and anemia can occur during the course of pregnancy[6]. Occasional abdominal pain can be related to an enlarging uterus and uterine cramps. Hemorrhoids or anal fissure can be common causes of rectal bleeding in pregnant women[7]. Pregnancy can limit the utilization of standard diagnostic and therapeutic tools due to a gravid uterus and a potentially vulnerable fetus[8], which in particular can hamper the liberal use of colonoscopy and computed tomography. However, all patients in our study group underwent complete colonoscopic evaluation before surgery. The age of diagnosis and tumor characteristics in our patients are similar to other series[5].

Ultrasonography (USG), magnetic resonance imaging (MRI) or computed tomography (CT) were used for disease staging in our series. USG, MRI and CT can be used during pregnancy after consenting the patients about the associated risks and benefits. Heat effects of the magnetic field can be risky for the fetus, especially in the first trimester[9,10]. CT scan has a limited role in pregnancy due to radiation and contrast[11]. Proctosigmoidoscopy may be very helpful for differential diagnosis since more than 85% of colorectal tumors diagnosed during pregnancy appear to develop below the peritoneal reflection[12]. In addition, common anorectal problems can be excluded with a careful anorectal exam. In our series, 5 patients had rectal and 1 patient had a sigmoid colon cancer. Diagnosis of colorectal cancer at an early stage would result in better outcomes. Gastrointestinal symptoms should not be overlooked in a pregnant woman and should be evaluated with proper diagnostic modalities.

According the American Society of Gastrointestinal Endoscopy guidelines, an endoscopic intervention is safer than radiologically guided or surgical operations[13]. It is preferable to postpone endoscopy to the second trimester[12]. However, patients should be informed about the potential side effects including over sedation leading to hypoventilation or hypotension, teratogenic effects of medications used for sedation and premature birth[13]. We did not experience any complications patient or fetus related in our diagnostic work-up. Familial adenomatous polyposis is a known risk factor for colorectal cancer during pregnancy[14]. In our cohort, 2 patients had a family history of HNPCC and both of these patients were later confirmed with positive genetic testing. One of our patients had juvenile polyposis syndrome and diagnosed with a right colon cancer but later expired due to metastatic disease. In this particular patient diagnosis was delayed 43 mo and was diagnosed in the postpartum period.

The treatment strategy for colorectal cancer should be no different for pregnant and non-pregnant patients in terms of the aim which is potential curative treatment of the disease. However, the well-being of the fetus should be considered. Termination of ongoing pregnancy or delay of required treatment should be discussed with the patient according to time of pregnancy and patient's preference[2,6,15]. The first trimester of pregnancy is not appropriate for chemotherapy because of high risk of fetal malformations[16]. While it is generally recommended that chemotherapy should be given only after delivery, there are some reports suggesting that chemotherapy can be given in the second trimester without causing significant long-term complications[6,17,18]. However, it has been reported that the administration of 5-florouracil during pregnancy may cause spontaneous abortion[12]. If maternal and/or fetal healths are threatened, pre-

term delivery can be considered[6]. Walsh *et al*[19] have proposed an algorithm to manage colorectal cancer diagnosed during pregnancy and recommend individualized treatment based on the disease stage and time of diagnosis during pregnancy. Acting as a team during follow-up and including the patient in decision making are advised.

While low patient number and retrospective design are the major drawbacks of the study, our study is one of the largest single center experiences on this topic. In our limited experience with three patients who have undergone surgery during pregnancy, no adverse maternal and fetal outcomes were observed. There has been a significant delay in the diagnosis of these tumors which is probably due to overlap of symptoms and signs between colorectal malignancy and a normal pregnancy.

ACKNOWLEDGMENTS

Poster presentation at the meeting of the American Society of Colon and Rectal Surgeons, 2014. Erman Aytac is an assistant professor of surgery at the Acibadem University in Istanbul, Turkey.

COMMENTS

Background

Colorectal cancer in pregnancy is a rare condition and the literature on this subject is scant with fewer than 300 cases reported. The diagnosis of colorectal cancer in pregnancy is usually delayed because the individuals are young and the diagnosis is not entertained. As two patients with possibly conflicting interests need to be managed, many ethical, psycho emotional and medical issues need to be simultaneously addressed. In this study, they analyzed management, complications, maternal and fetal outcomes in patients who were diagnosed with colorectal cancer during pregnancy or in the immediate postpartum period.

Research frontiers

Around 0.1% of pregnant women develop a malignancy and there is limited experience on the management of colorectal cancer diagnosed during pregnancy or perinatal period. When colorectal cancer is detected in this period, treatment options may be limited.

Innovations and breakthroughs

In the authors' experience with three patients who have undergone surgery during pregnancy, no adverse maternal and fetal outcomes were observed. There has been a significant delay in the diagnosis of these tumors which is probably due to overlap of symptoms and signs between colorectal malignancy and a normal pregnancy.

Applications

The treatment strategy for colorectal cancer should be no different for pregnant and non-pregnant patients in terms of the aim which is potential curative treatment of the disease. Considering the significant delay in the diagnosis of these tumors during pregnancy, new diagnostic modalities with reduced fetal side effects would facilitate diagnosis of colorectal cancer.

Terminology

Patients who were diagnosed with colorectal cancer during pregnancy or in the postpartum period were analyzed in the study. The postpartum period is defined as first 6 mo after delivery.

Peer-review

In this retrospective study by Aytac *et al* the authors are presenting their experiences in the management of colorectal neoplasia during pregnancy and in the postpartum period. This is a well written paper with insightful, thoughtful and helpful observations which are a result of serious and hard work from an experienced team of experts in the field of colorectal surgery.

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P- Reviewer: Izbicki JR, Lodge JP **S- Editor**: Qi Y **L- Editor**: A **E- Editor**: Lu YJ

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