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Clinical Case Report

## Massive Retroperitoneal and Subcutaneous Emphysema after Transanal Excision of Rectal Cancer

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### Abstract

Transanal excision (TAE) is considered a safe, alternative approach for patients with early stage of rectal cancer. Complications associated with TAE are rare, such as bleeding, perforation, incontinence, and rectal stricture. Subcutaneous emphysema is early complication of laparoscopic surgery, common during upper gastrointestinal and gynecological surgery. We report a case of retroperitoneal and subcutaneous emphysema emerging after transanal excision of rectal tumor.

The patient presented with changed bowel habits. Colonoscopy with pathology reports, ultrasound and magnetic resonance imaging (MRI) showed an adenocarcinoma in the rectum at a 5 cm from the anus, and did not reveal signs of invasive growth, pathologic lymph nodes, or systemic metastases. After surgery patient complained about abdominal pain and severe subcutaneous emphysema. Computed tomography showed retroperitoneal emphysema with no signs of rectal wall defect. He received antibiotics, was kept hospitalized with a solid diet and the retroperitoneal air disappeared on the thoracic X-ray.

Patients who remain clinically stable or steadily improving without signs of peritonitis can be managed conservatively. Only in case of ineffectiveness of conservative therapy, undergo surgery.

**Key words:** Rectal cancer; transanal excision; subcutaneous emphysema.

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## Introduction

Colorectal cancer (CRC) is a widespread disease, the fourth most diagnosed among all cancers. CRC is the third leading cause of cancer death in the world [1]. Mostly this type of cancer occurs in adults' gastrointestinal tract leading to high morbidity and mortality rates worldwide [2].

Radical surgical excision is a mainstay of treatment for cases of resectable cancers. Early rectal cancers are resectable and surgery can be performed as the sole treatment or with neoadjuvant and/or adjuvant therapy. Radical surgery alone is usually curative but can have a substantial impact on the quality of life, including the possibility of permanent colostomy and sexual dysfunction [3,4]. Considering the morbidity associated with radical surgery, alternative approaches of early rectal cancer treatment have been explored.

Currently, transanal excision (TAE) or transanal endoscopic microsurgery (TEM) and transanal minimally invasive surgery (TAMIS) are widely used for patients with

early stage of colorectal cancer [5].

Intraoperative and postoperative complications associated with early rectal cancer treatment are rare and include bleeding, perforation, incontinence, and rectal stricture [6]. Surgical emphysema is a known early complication of laparoscopic surgery, common during upper gastrointestinal and gynecological surgery.

There are few reported cases of subcutaneous emphysema after TEM [7] and one case after TAE [8].

Here we report a case of a patient with massive retroperitoneal and subcutaneous emphysema, which is a rare life-threatening complication after TAE.

## Case presentation

A 42-year-old man was referred to our hospital with changed bowel habits including frequent defecation and soiling. The colonoscopy revealed signs of ulcerative colitis and chronic anal fissure. Endoscopic ultrasound showed a mass in the rectum at a 5 cm distance from the anus with no muscular layer invasion and no enlarged pararectal lymph nodes. Magnetic resonance imaging (MRI) before surgery did not show signs of invasive growth, pathologic lymph nodes, or systemic metastases; it showed a local area of thickening (2.5 x 2.4 x 0.44 cm) along the frontal wall of the rectum at 4.5 cm distance from the anus (Figure 1). Pathology reports from that lesion showed adenocarcinoma. The tumor was therefore staged as a cT1N0M0 rectal carcinoma and the patient was referred for a TAE.

Before the surgical procedure, antibiotic prophylaxis was given, and the tumor was visualized on the ventral side of the rectum using rectoscopy. The patient was placed in a prone position and the lesion was macroscopically radically removed. No rectal perforation into the peritoneal cavity was observed, the defect in the rectal wall was closed with a running suture. Pathological examination confirmed well-differentiated adenocarcinoma with submucosal invasion (G1) and severe dysplasia in the resection margins.

On a postoperative day 2, the patient experienced abdominal pain and severe subcutaneous emphysema. An abdominal X-ray showed signs of intestinal obstruction.

Blood analysis revealed a slight leukocytosis (12.0 k/ $\mu$ L) and elevation of C-reactive protein (CRP) level to 200 mg/L. Elevated inflammatory parameters, rectal perforation with leakage was suspected and an abdominal computed tomography (CT) scan was performed. Computed tomography showed massive emphysema of the abdominal cavity, retroperitoneal space, pelvis, and mediastinum with no signs of rectal wall defect (Figure 2 A-C)

Intravenous antibiotics (Metronidazole 500 mg, Cefuroxime 1500 mg, both 3 times daily for 3 days) were started empirically, and the patient was kept hospitalized with a solid diet until all subcutaneous air resolved three days later. The retroperitoneal air disappeared on the thoracic X-ray 3 days after, CRP and white blood count level normalized. On the 9th day after the operation, the patient was discharged. Follow-up did not show any abnormalities.

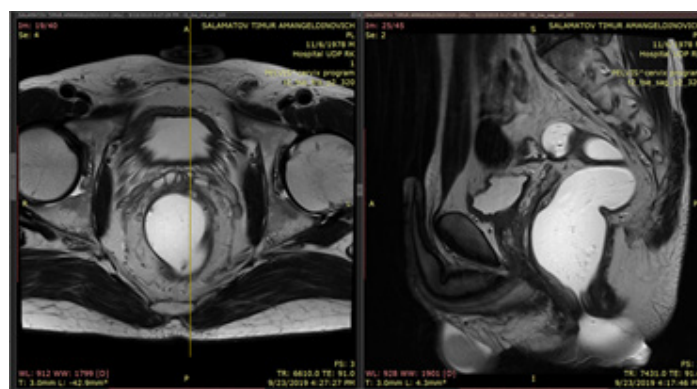


Figure 1 - Pelvis magnetic resonance tomogram showing the tumor (arrows)

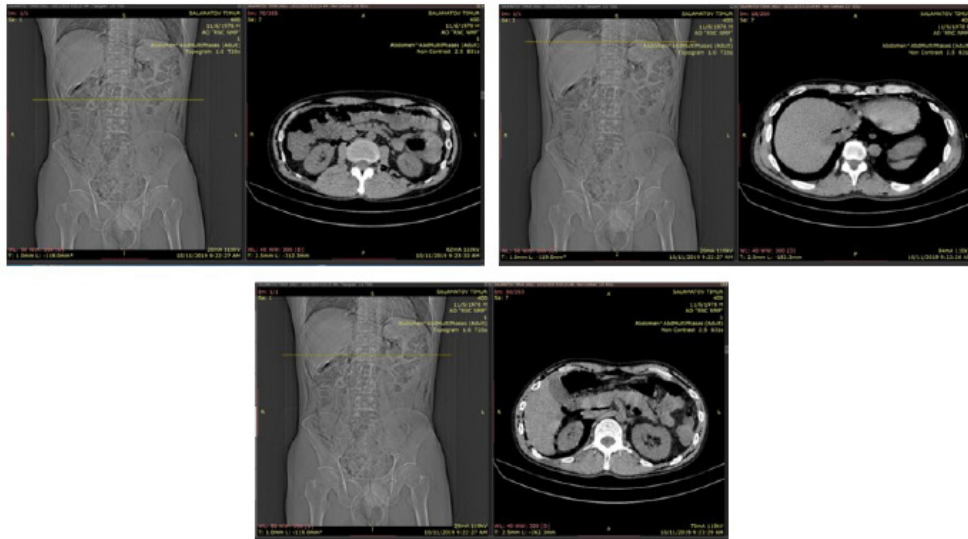


Figure 2 - Computed tomography scan. A: Abdominal computed tomography scan showing intraperitoneal air surrounding the liver (arrow). B: Abdominal computed tomography scan showing retroperitoneal air surrounding the right kidney (arrow). C: Abdominal computed tomography scan showing subcutaneous air (arrow)

## Discussion

A postoperative pneumoperitoneum following abdominal surgery may be a normal finding due to the air introduced during surgery or postoperative drains. However, a pneumoperitoneum on plain radiographs may also be an indicator of anastomotic leakage or gastrointestinal perforation [9]. These serious and potentially life-threatening complications often require immediate surgery and the formation of a diverting colostomy. Subcutaneous emphysema is frequently seen in emergency and pathophysiology of subcutaneous emphysema in laparoscopic surgery includes tracking of gas along fascial planes from port sites (increasing number of ports giving rise to increasing incidence of emphysema), or through diaphragmatic defects [10,11]. The possibility of a full-thickness defect of the rectal wall should always be considered in patients with subcutaneous surgical emphysema.

Other case reports presented patients with subcutaneous and retroperitoneal emphysema after

laparoscopic colorectal surgeries with no signs of rectal perforation. In our case report, subcutaneous emphysema and the suggestion of “free air” in the abdomen were suggestive of a persisting rectal wall perforation to the peritoneal cavity. However, no such defect in the rectal wall was seen on computed tomography.

We suppose that these features were most probably caused by the insufflation of CO<sub>2</sub> gas before the surgery, during the colonoscopy procedure. During this procedure, CO<sub>2</sub> is insufflated into the colon and at the time of the surgery and after CO<sub>2</sub> “escaped” through the loose connective tissue into the retroperitoneal cavity and subcutaneously. In this case report, an impressive but self-limiting complication occurred being massive subcutaneous and retroperitoneal emphysema.

## Conclusion

Although subcutaneous emphysema is a rare complication after colorectal surgery, surgeons should exclude other complications before managing the condition conservatively. Clinical manifestations such as fever and pain should not be considered as indication for immediate surgery. Patients who remain clinically stable or steadily improving without signs of peritonitis can be managed conservatively. Only in case of ineffectiveness of conservative therapy, undergo surgery.

**Acknowledgements.** We would like to thank the patient who allowed us to share their details of the treatment.

**Statement of Ethics.** Written informed consent was obtained from the patient for publication of this case report and any accompanying images. This case report was conducted in compliance with the principles of the Declaration of Helsinki. The Ethical Committee of National Research Oncology Center (permit number №6) approved this study.

**Conflict of Interest Statement.** The authors have no conflicts of interest to declare.

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**Author Contributions.** All authors were involved in the preparation of this manuscript. Anna Midlenko, Saule Khamzina collected the data and wrote the manuscript. Meiram Mamlin performed the operation and designed the study. Adilbek Mukazhanov summarized the data and revised the manuscript. All authors read and approved the final manuscript.

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## Тік ішектің қатерлі ісігін трансанальды кесуден кейінгі массивті ретроперитонеальді және тері асты эмфиземасы

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## Түйіндіме

Трансанальды кесу тік ішек обырының ерте сатысында науқастар үшін қауіпсіз балама емдеу әдісі болып саналады. Трансанальды кесумен байланысты қан кету, перфорация, зәр ұстамау және тік ішектің тарылуы секілді асқынулар сирек кездеседі. Тері асты эмфиземасы - лапароскопиялық хирургияның ерте асқынуы. Ол көп жағдайда асқазан-ішек жолдарының жоғарғы бөліктеріне жасалған хирургиялық араласу немесе гинекологиялық операцияларда орын алады.

Біз бұл мақалада тік ішектің қатерлі ісігін трансанальды жолмен алып тастағаннан кейін ішастар және тері астында пайда болған эмфизема туралы баяндаймыз. Науқас іш қату шағымдарымен келді. Патогистологиялық зерттеу қорытындысы, колоноскопия, ультрадыбыстық зерттеу және магниттік-резонанстық томография нәтижесінде тік ішекте анустан 5 см қашықтықта аденокарциноманы анықталды. Инвазивті өсу, патологиялық лимфа түйіндері немесе метастаз белгілері анықталған жоқ. Отадан кейін науқас іштегі ауырсыну сезімі мен тері астындағы эмфиземаға шағымданды. Компьютерлік томографияда тік ішек қабырғасында ақау белгілері болмады, бірақ нәтиже ішастар астындағы кеңістіктің эмфиземасын көрсетті. Науқасқа антибактериалды терапия тағайындалып, диета сақталды. Кеуде қуысының рентгенінде ішастар астындағы ауа кеңістігі жоғалды.

Науқастың жалпы жағдайы клиникалық тұрақты болып, перитонит белгілерінсіз қысқа уақытта жақсарады. Консервативті емдеу тактикасы таңдалды. Консервативті ем тиімсіз болған жағдайда ғана ота жасау көрсетіледі.

Түйін сөздер: тік ішек обыры, трансанальды кесу, тері асты эмфиземасы.

## Массивная забрюшинная и подкожная эмфизема после трансанального иссечения рака прямой кишки

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### Резюме

Трансанальное иссечение считается безопасным альтернативным подходом лечения для пациентов с ранней стадией рака прямой кишки. Осложнения, связанные с трансанальным иссечением, встречаются редко, это кровотечение, перфорация, недержание мочи и стриктура прямой кишки. Подкожная эмфизема является ранним осложнением лапароскопической хирургии, часто встречается во время хирургических вмешательств на верхних отделах желудочно-кишечного тракта и гинекологических операциях.

Мы сообщаем о случае забрюшинной и подкожной эмфиземы, возникшей после трансанального удаления опухоли прямой кишки. Пациент поступил с жалобами на запоры. Колоноскопия с заключением патогистологического исследования, ультразвуковое исследование и магнитно-резонансная томография выявили аденокарциному в прямой кишке на расстоянии 5 см от заднего прохода и не выявили признаков инвазивного роста, патологических лимфатических узлов или метастазов. После операции у пациента появились жалобы на боли в животе и подкожную эмфизему. Компьютерная томография показала эмфизему забрюшинного пространства без признаков дефекта стенки прямой кишки. Была назначена антибактериальная терапия, соблюдалась диета, и, забрюшинный воздух исчез на рентгеновском снимке грудной клетки.

Пациенты, общее состояние которых клинически стабильное или стремительно улучшается без признаков перитонита, то лечебная тактика консервативная. Только в случае неэффективности консервативной терапии показана операция.

Ключевые слова: рак прямой кишки, трансанальное иссечение, подкожная эмфизема.