Vol.9, No. 03; 2025

ISSN: 2581-3366

Specific Features of Proctectomy in a Pelvis Presenting Anatomical Variation Type: Bilateral Kidney Ectopia.

N. Chadli¹, M E A. Meghaizerou², R. Djaid1, M N E. Bouhafs¹, A. Menasria¹, A. Remini¹, A. Benslimane¹, A. Belkadi¹, N E. Tahlaiti¹, H. Abdelmounaim¹, K. Fasla³, A. Bengueddache⁴, O. Tilioua¹, M. Habarek^{5*}

¹Department of General and Laparoscopic Surgery, Oran teaching hospital, Algeria.

²Department of General Surgery, El Amria Hospital, Ain Temouchent, Algeria.

³Department of Intensive Care-Anesthesia, Oran teaching hospital, Algeria.

⁴Department of Oncology, Oran teaching hospital, Algeria.

⁵Department of General Surgery, Tizi Ouzou Teaching Hospital, Algeria. *

* Correspondence author: <u>Meziane.Habarek@ummto.dz</u> (M. Habarek), Department of General Surgery Tizi Ouzou, Teaching Hospital, Faculty of Medicine, University Mouloud Mammeri of Tizi Ouzou Algeria Tel: 00 213 5 60 53 71 50.

doi: 10.51505/ijmshr.2025.9302 URL: http://dx.doi.org/10.51505/ijmshr.2025.9302

Received: Apr 25, 2025

1 C J

Accepted: May 03, 2025 Online Published: May 24, 2025

Abstract

A 66-year-old woman with hypertension was admitted for the management of a moderately differentiated adenocarcinoma (ADK) of the mid and lower rectum, revealed by chronic constipation lasting over a year. Additional examinations identified a tumor in the mid and lower rectum, classified as cT3NxM0, with an abnormal anatomical positioning of both kidneys in a pelvic location. Following discussion in a multidisciplinary team meeting, the patient underwent chemotherapy (CT) alone, followed by a laparoscopic proctectomy with total mesorectal excision (TME), preserving both kidneys and their vascularization. This article aims to highlight the importance of understanding the anatomical relationships between the rectum and pelvic kidneys, the potential pitfalls to avoid during pre and intraoperative management, and the value of a multidisciplinary approach.

Keywords: CT scan, pelvic MRI, kidney, laparoscopy, pelvis, rectal adenocarcinoma.

1. Introduction:

The positioning of the kidneys in a pelvic location falls under the category of renal ectopia, which results from a failure of kidney migration during intrauterine life (IUL) between the 6th and 8th weeks of gestation [1,2]. This anomaly is rare, with an estimated incidence of 1 in 2,100 cases according to studies [1,2]. The coexistence of an ectopic kidney and rectal cancer is even rarer (exact figures are not available). The management of rectal cancer becomes challenging due

Vol.9, No. 03; 2025

to the anatomical arrangement (position and vascular anomalies), which may contraindicate certain therapeutic approaches, such as radiotherapy. In this article, we describe our experience in treating a patient with mid and low rectal cancer and bilateral ectopic kidneys in a pelvic position, along with a review of the literature.

2. Case report:

A 66-year-old female patient with a history of hypertension under treatment and follow-up for rheumatoid arthritis presented to the clinic with chronic constipation associated with rectal syndrome.

A recto sigmoidoscopy revealed a polypoid mass measuring 45 mm, located 3 cm from the anal margin, palpable on digital rectal examination, soft and mobile. Histopathological analysis of the biopsies confirmed a well-differentiated rectal adenocarcinoma.

Pelvic MRI showed a tissue thickening in the mid-rectum measuring 20 mm, extending over 34 mm, with slight infiltration of the mesorectum, more pronounced on the left side, remaining 3 cm from the anal margin. Bilateral renal ectopia in a pelvic position was noted, without dilation of the excretory cavities.

CT scan of the thorax, abdomen, and pelvis (TAP) as part of the staging workup revealed a right mesorectal lymph node without secondary lesions, along with bilateral renal ectopia in a pelvic position and no dilation of the excretory cavities.

Analysis of the vascularization of the two ectopic kidneys showed the following (figure 1)

- The right renal artery arises from the internal aspect of the right iliac artery, giving off three segmental branches.
- The venous drainage of the right kidney is achieved through two segmental veins (superior and inferior), which drain into the left common iliac vein and the right internal iliac vein, respectively.
- The left renal artery originates from the anterolateral aspect of the terminal aorta, 7 mm from the aortic bifurcation.
- The left kidney receives a superior polar branch from the right renal artery.
- The venous drainage of the left kidney is accomplished through two segmental veins (superior and inferior), which drain into the inferior vena cava and the left common iliac vein, respectively.

Vol.9, No. 03; 2025

ISSN: 2581-3366



www.ijmshr.com

Page 19

Vol.9, No. 03; 2025

ISSN: 2581-3366

Figure 1: Study of the vascularization of the two ectopic kidneys
A: origin of right renal artery.
B: origin of left renal artery.
C: polar left superior renal artery from right renal artery.
D, E, F, G: other views of vascularization.

The patient's case was discussed in a Multidisciplinary Team Meeting, and the tumor was classified as T3N1M0. Given the ectopic position of the kidneys, chemotherapy alone was decided upon to avoid the nephrotoxicity associated with radiotherapy. Five sessions of chemotherapy were administered.

The patient underwent surgery under general anesthesia using a laparoscopic approach. After creating a pneumoperitoneum with a Veress needle at a pressure of 12 mmHg, the exploration revealed no peritoneal carcinomatosis nodules or liver metastases. However, a small amount of ascitic fluid was noted and collected for cytological analysis.

The two ectopic kidneys were also identified in a pelvic position (Figure 2).



RK: Right Kidney; LK: Left Kidney

The procedure began with a medial approach to the sigmoid mesocolon after identifying the promontory. A careful dissection was performed, taking into account the position of the left kidney, its vascular pedicle, and the left ureter. (figure 3, 4)

www.ijmshr.com

Vol.9, No. 03; 2025

ISSN: 2581-3366



Figure 3: Medial approach to the sigmoid mesocolon



A proctectomy with total mesorectal excision (TME) was performed, staying close to the rectal wall. Control of the inferior mesenteric pedicle was achieved through high ligation after identifying and locating the origins of the renal arteries, particularly the left renal artery. (figure 5)

Vol.9, No. 03; 2025

ISSN: 2581-3366



Figure 5: Aspect of the kidney after release of the sigmoid colon and its mesentery.

The rectum was transected 2 cm below the lower pole of the tumor using a linear mechanical stapler. The specimen was exteriorized through a mini Pfannenstiel incision, and the colon was transected with placement of the anvil of the circular stapler. The procedure then returned to laparoscopy, and a low colorectal anastomosis was performed using a 29 mm circular stapler, with a negative air leak test confirming its integrity. (figure 6).

The operation was completed with pelvic drainage, complete exsufflation, and closure of the trocar sites.



Figure 6: Low colorectal anastomosis performed using a circular stapler.

Vol.9, No. 03; 2025

The postoperative course was uneventful, with a favorable clinical outcome. Bowel transit resumed, and the drain was removed on postoperative day 3. Oral feeding was initiated on day 2, and the CRP levels showed a declining trend from day 2 to day 4. The patient was discharged on postoperative day 7.

3. Discussion:

The position of the pelvic kidney varies from the iliolumbar area, in the iliac fossa, and over the sacrum to below the pelvic brim [1]. The left-sided kidneys are slightly higher than those on the right. [2]. Renal ectopia is a rare anatomical condition, occurring in approximately 1 in 2,100 cases [3,4], and involves various vascular and urinary variations that make surgical approaches challenging and risky. The incidence of bilateral renal ectopia associated with rectal cancer is extremely rare, necessitating a patient-tailored approach and requiring collaboration among digestive surgeons, urologists, vascular surgeons, radiologists, oncologists, and radiation therapists.

Preoperatively, a CT scan is essential to study the possible anatomical variations, including the location of the ectopic kidneys, the type of ectopia, and the origins of the renal arteries and veins. The emergence of renal arteries has been classified into several categories: modal position, suprarenal aorta, infrarenal aorta, aortic bifurcation, common iliac artery/vein, iliac bifurcation, internal iliac artery/vein, and external iliac artery/vein [5]. Ectopic kidneys have been classified according to the most common combinations of arterial and venous origins [5]. The standard treatment for mid and low-rectal cancer beyond stage II follows established protocols for neoadjuvant therapy, which typically involves radiation (25 to 50 Gy) combined with chemotherapy [6].

The pelvic ectopic position of the kidneys exposes them to the toxic effects of radiotherapy. Indeed, radiation can cause significant renal toxicity if the dose exceeds 20 Gy for both kidneys. Beyond this dose, end-stage renal failure may develop due to glomerular and juxtaglomerular damage [7]. Alternatives to renal irradiation are limited. Renal transposition has been proposed but remains technically complex and is associated with significant potential morbidity and mortality [8]. Reducing pelvic radiation doses is possible but risks compromising efficacy compared to chemotherapy alone.

The surgical management of rectal cancer in the presence of bilateral renal ectopia presents several technical and strategic challenges. The restricted anatomical space and altered pelvic relationships increase the risk of vascular and urinary injuries during dissection. Careful dissection and prior anatomical mapping are essential to accurately identify the renal pedicles and ureters, which is crucial to prevent irreversible damage that could compromise renal function [7]. The management must be multidisciplinary, involving close collaboration among surgeons, radiologists, and anesthesiologists.

www.ijmshr.com

Vol.9, No. 03; 2025

ISSN: 2581-3366

Although laparoscopy provides excellent visualization of the pelvis, anatomical variations can complicate typically standardized procedures, necessitating technical adaptations, particularly during rectal dissection and colorectal anastomosis, sometimes requiring conversion to laparotomy [3, 4]. Patients with renal anomalies may have a significant risk of postoperative urinary or infectious complications, requiring enhanced monitoring and preventive management.

4. Conclusion:

The surgical management of rectal cancer in the context of bilateral renal ectopia represents a rare but significant challenge, requiring meticulous preparation and multidisciplinary expertise. This case highlights the crucial importance of preoperative imaging for accurate mapping of anatomical variations and surgical planning.

Preserving renal function, mastering dissection techniques, and adapting therapeutic strategies, such as excluding radiotherapy, are key steps to optimize outcomes.

This report also underscores the feasibility and safety of a well-executed laparoscopic approach in an atypical anatomical context.

Finally, it emphasizes the necessity of multidisciplinary collaboration to ensure individualized and effective management of patients with complex congenital anomalies.

Acknowledgements

None.

Conflicts of Interest

None of the authors have any conflicts of interest (financial or otherwise) to disclose.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

References:

- Dretler SP, Olsson C, Pfister RC. The anatomic, radiologic and clinical characteristics of the pelvic kidney: an analysis of 86 cases. J Urol 1971;105:623-7.
- Kara E, Oztürk NC, Ozgür A, Yıldız A, Oztürk H. Ectopic kidney with varied vasculature: demonstrated by CT angiography. Surg Radiol Anat 2011;33:81-4.
- Takeda, Koki, et al. « Conversion during Laparoscopic Anterior Resection for Rectal Cancer with a Congenital Solitary Pelvic Kidney: A Case Report ». Asian Journal of Endoscopic Surgery, vol. 11, nº 1, février 2018, p. 56-59. DOI.org (Crossref), https://doi.org/10.1111/ases.12415.

www.ijmshr.com

Vol.9, No. 03; 2025

ISSN: 2581-3366

- Byung Kwan Park, Yong Gum Park, Beom Gyu Kim. Safe Completion of Laparoscopic Anterior Resection in a Patient with a Solitary Pelvic Kidney: A Case Report. Ann Coloproctol 2021;37(1):61-64 https://doi.org/10.3393/ac.2018.11.21
- Erdoğan, Hasan. « Evaluating the Origin of Vascular Structures in Ectopic Kidneys with Multidetector Computed Tomography ». *Abdominal Radiology*, vol. 45, n° 6, juin 2020, p. 1907-14. *DOI.org (Crossref)*, https://doi.org/10.1007/s00261-020-02455-0.
- Cotte E, Artru P, Bachet JB, Benhaim L, Bibeau F, Christou N, Conroy T, Doyen J, Fabre J, Hoeffel C, Léonard D, Meillan N, Mirabel X, Pioche M, Rivin Del Campo E, Vendrely V, Huguet F, Bouché O. « Cancer du rectum ». Thésaurus National de Cancérologie Digestive, septembre 2023, [En ligne] [http://www.tncd.org].
- Wong Hee Kam, S., et F. Huguet. « Dose de tolérance à l'irradiation des tissus sains : le rein ». *Cancer/Radiothérapie*, vol. 14, n° 4-5, juillet 2010, p. 340-43. *DOI.org (Crossref)*, https://doi.org/10.1016/j.canrad.2010.02.004.
- Rosenshein NB, Lichter AS, Walsh PC. Cervical Cancer Complicated by a Pelvic Kidney. Journal of Urology [Internet]. 1980 May 1 [cited 2025 Jan 24];123(5):766–7. Available from: https://doi.org/10.1016/S0022-5347(17)56123-6