Case Report

DOI: 10.7860/JCDR/2025/77070.21237

# Rectal Cancer Presenting with Isolated Thyroid Metastasis: A Case Report

Oncology Section

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## ABSTRACT

A 59-year-old female with chief complaints of white discharge per rectum for one month, pain in the lower abdomen for one month, and neck swelling for six months. She was diagnosed with adenocarcinoma of the rectum with a single site of metastases in the right lobe of the thyroid. The patient was given six months of FOLFOX, following which the rectal primary showed a complete response but stable disease in the thyroid lesion. The patient underwent a thyroidectomy, which confirmed a metastasis from the rectum. She was given radiation to the thyroid bed postoperatively and underwent chemoradiation for the rectal primary. She underwent a wait-and-watch approach and is disease free for two years. Thyroid metastases from Colorectal Carcinoma (CRC) are an uncommon clinical finding, accounting for 2-3% of all malignant tumors of the thyroid. The reported incidence in CRC patients is approximately 0.1%, with most cases involving extensive disease and poor prognosis. In the available literature, only 24 cases of thyroid gland metastases from CRC are reported. However, isolated metastases to the thyroid have been observed, raising diagnostic and therapeutic challenges. Fine-needle aspiration cytology and Immunohistochemistry (IHC), using markers such as Thyroid Transcription Factor-1 (TTF-1), Thyroglobulin (Tg), and CDX2, play pivotal roles in confirming the diagnosis. Advances in imaging, particularly Positron Emission Tomography (PET) scans, have improved detection rates. The vascular and lymphatic systems facilitate metastatic spread, yet the role of thyroidectomy remains controversial due to a lack of survival benefits. Chemotherapy and radiotherapy are typically reserved for palliation in cases of advanced disease.

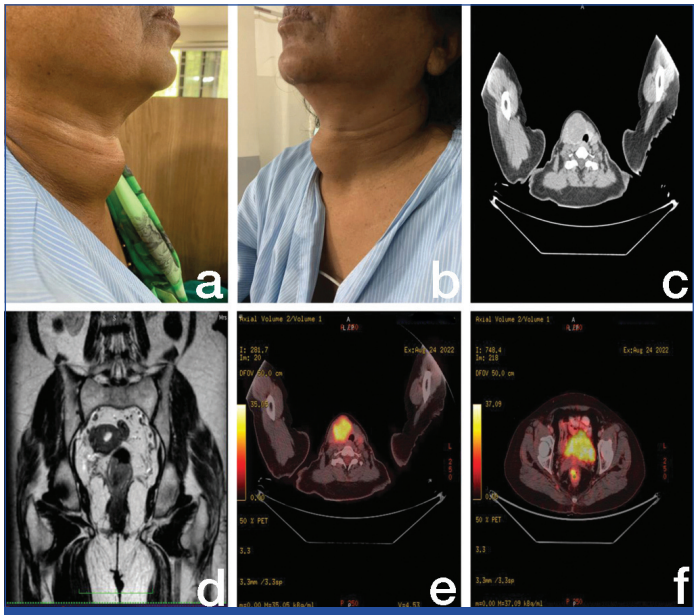
**Keywords:** Colon cancer, Colorectal neoplasms, Thyroid gland, Thyroidectomy

## CASE REPORT

A 59-year-old female presented to the cancer clinic with chief complaints of white discharge per rectum for one month, pain in the lower abdomen for one month, and neck swelling for six months. The rectal discharge was white, foul smelling, spontaneous and was associated with mild pain in the anal region. The lower abdominal pain was dull, localised and intermittent. The neck swelling was insidious in onset, non-tender, and gradually increased in size [Table/Fig-1a,b]. On examination of the rectal region, a polypoidal swelling with the stalk was present at the 6-7 o'clock position, situated approximately 2 cm from the anal verge. The abdominal and chest examinations were unremarkable before coming to our clinic, the patient had undergone imaging. Contrast-Enhanced Computer Tomography (CECT) of pelvis and neck showed a well-defined intra-luminal mass in the rectum and a thyroid growth compressing the underlying trachea [Table/Fig-1c]. Magnetic Resonance Imaging (MRI) showed well-defined polypoidal soft-tissue thickening along the posterior wall of mid-rectum (3 to 9 o'clock) appearing T2WI iso-to-hyperintense, depicting areas of restricted diffusion [Table/Fig-1d]. The lesion was approximately 4 cm from the anal verge, for a length of approximately 4 cm and of size 2.3*2.6 cm. Few (2-4) sub-centimetric-sized oval heterogeneous meso-rectal nodes showing diffusion restriction noted, the largest measuring 7*7*6 mm at 5 o'clock position, 2 cm from the rectum, and another 6*6 mm at 4 o'clock, showing T2 hypointense and areas of restricted diffusion.

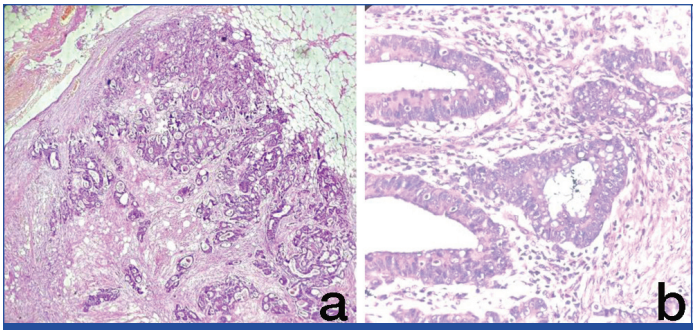
Additionally, we advised the patient to undergo a PET, which revealed hot spots in the rectal region, right lobe of the thyroid gland extending to the isthmus and right level IB and bilateral level II cervical lymph nodes [Table/Fig-1e,f]. A biopsy performed from the rectal mass was taken which was suggestive of moderately differentiated adenocarcinoma of the rectum [Table/Fig-2a,b].

Noting the findings of the Fluorodeoxyglucose (FDG) PET scan, fine needle aspiration from thyroid swelling was performed, which revealed deposits of adenocarcinoma. Serum Carcinoembryonic Antigen (CEA) levels were 24.79 ng/mL, and the thyroid profile was normal.



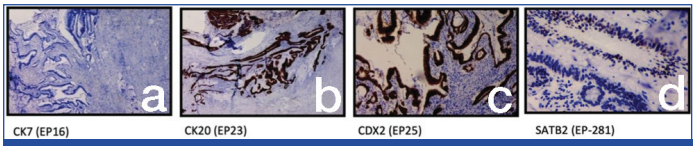

**[Table/Fig-1]:** a,b) showing neck swelling; c) showing an axial image of the neck with a thyroid growth compressing the underlying trachea; d) MRI pelvis coronal image showing the growth occupying the rectum; e) The FDG PET image of the same neck swelling shows an increased SUV; f) FDG PET image of the pelvis showing rectal growth.

A Multidisciplinary Tumour Board (MDT) discussion was held, and the patient was planned for chemotherapy, followed by a reassessment. Next-generation sequencing was done using tumour tissue, and it showed no somatic mutation. The patient was started on oxaliplatin 100 mg/m$^2$, Leucovorin 400 mg/m$^2$, 5 fluorouracil 400 mg/m$^2$ bolus, and 5 fluorouracil 2400 mg/m$^2$ continuous infusion over 46 hours. The patient completed 12 cycles of FOLFOX and responded well to chemotherapy. Her thyroid swelling did not respond to the chemotherapy. FDG PET showed a complete response, but thyroid swelling showed no response. The case was discussed in MDT, and a thyroidectomy was planned, followed by




**[Table/Fig-2]:** A biopsy specimen from rectal growth showed malignant cells depicting adenocarcinoma: a) 4x Haematoxylin and Eosin (H&E) stained section shows irregularly branched glandular structure; b) 10x H&E stained section shows glands lined by tall columnar cells with loss of polarity and nuclei are tall elongated hyperchromatic having high N:C ratio.

chemoradiotherapy to rectal primary. The Histopathology Report (HPR) of thyroid showed adenocarcinoma cells, which were confirmed to be colorectal in origin by IHC which was positive for CK20, CDX2 and SATB2 [Table/Fig-3a-d].




**[Table/Fig-3]:** The panel shows IHC markers at 10x on the HPR specimen of thyroid: 3a) CK7 negative; 3b) CK20 positive; 3c) CDX2 positive; 3d) SATB2 positive.

She was given postoperative radiation to the post-thyroidectomy site. Her rectal primary after completion of six months of FOLFOX was given chemoradiation. She achieved complete response on subsequent response scan and was offered a wait-and-watch approach with close monitoring. She has been disease-free 20 months after trimodality therapy.

## DISCUSSION

The thyroid gland is a rare site of metastasis of malignant tumours, representing only 2-3% of all malignant tumours of the thyroid gland [1]. Approximately, 20% of individuals with colon cancer had metastases upon diagnosis, with the most frequent locations being the liver, lungs, and peritoneum. The metastatic spread of CRC to the thyroid gland is an infrequent occurrence [2]. The patient with colorectal cancer metastasis to the thyroid gland does not respond to chemotherapy or radiotherapy, so the prognosis is very poor [3].

Thyroidectomy is a controversial option with no proven benefit or improvement in rates of Overall Survival (OS) [4]. We, therefore, report a case of CRC with metastasis to the thyroid gland, which was diagnosed synchronously. CRC very rarely metastasises to the thyroid gland [5]. In patients suffering from colorectal cancer, the occurrences of thyroid metastases are rare since Lievre A et al., noted only six patients out of the 5,862 cases, which translates to 0.1%, having confirmed thyroid metastases [6]. Most patients had extensive illness, including lung and/or liver metastases, with a poor prognosis.

However, some patients have thyroid metastases without other distant lesions, which could be explained by the spread of tumour cells to the inferior vena cava through the vertebral vessels [7]. Fine needle aspiration cytology/biopsy helps diagnose thyroid masses and has proven to be a guiding investigation to ascertain tissue diagnosis [8]. IHC may help to confirm whether it is thyroid cancer or metastatic cancer. TTF-1 and Tg are thyroid-specific markers, and CDX2 is a tumour marker of gastrointestinal origin adenocarcinomas, especially metastatic CRC [9]. Although thyroid metastases from CRC are rare, more occurrences are being reported due to the introduction of more accurate imaging scans and the increased survival rate of patients. Understanding the molecular markers of primary thyroid cancers is valuable in differentiating thyroid neoplasms from extra-thyroidal metastases. In the case of patients suffering from CRC metastases, KRAS and NRAS mutations are assessed prior to the administration of anti-EGFR target therapy because RAS mutations render the treatment ineffective. In such cases, if wild type RAS is found, the patient is then eligible for treatment with anti-EGFR antibody [10].

Recently, there has been a greater utilisation of PET scans for diagnosis, preoperative staging, and follow-up for patients with cancer [11]. Metastatic deposits occur in the thyroid gland due to vascular or lymphatic spread [12]. The lungs and liver have some filtration role for metastatic emboli which is not present in the thyroid gland. The neoplastic invasion of the thyroid gland is blood-borne. A hypothesis suggests that tumour cell growth is inhibited by high iodine concentrations and high oxygen saturation and that thyroid hormones may have a cytostatic effect under metastatic cells [13]. Metastasis to the thyroid glands can be asymptomatic or symptomatic dyspnoea, dysphagia, hoarseness, palpitation or pain. Laboratory thyroid function tests are often standard. However, hypothyroidism and hyperthyroidism have been reported. Management of thyroid metastases should depend on the individual case. The average thyroid carcinoma patient suffering from thyroid dysfunction survived post-diagnosis for only three to six months. Of these patients, those identified with a single metastatic focus within the gland survived longer than those with multiple metastatic foci [14].

There is no clear consensus; nevertheless, some earlier studies propose a thyroid lobectomy and/or isthmectomy for solitary thyroid metastasis and a complete thyroidectomy for bilateral metastases. Survival results of thyroidectomy depend on the primary tumour [15]. There is still little evidence suggesting that performing a thyroidectomy on patients suffering from thyroid metastasis results in any improvement in OS [16]. Metastatic thyroid cancers that are limited to the thyroid have reasonable OS and selective thyroidectomy is a safe procedure. KRAS mutations make the targeting of EGFR ineffective, hence ascertaining the metastatic site versus a second primary is very useful in selecting therapy [17]. For those patients who have a progressive illness or have other health complications making surgery too risky, radiation and chemotherapy are often the last resort [18]. In the available literature, only 24 cases of thyroid gland metastases from CRC are reported. Majority of these patients suffered grave deterioration and died within a few months, with very few surviving beyond two years [19].

## CONCLUSION(S)

Patients with thyroid metastases originating from CRC typically have an extensive illness and a low OS. PET scans may aid in the diagnosis of thyroid metastases, particularly in the context of lung or liver metastasis. The time of thyroid resection must be carefully considered in light of other metastatic locations, which may result in a favourable outcome.

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**PLAGIARISM CHECKING METHODS:** [Jain H et al.]
- Plagiarism X-checker: Dec 04, 2024
- Manual Googling: Feb 08, 2025
- iThenticate Software: Feb 11, 2025 (17%)

**ETYMOLOGY:** Author Origin

**EMENDATIONS:** 7

**AUTHOR DECLARATION:**
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Dec 04, 2024**
Date of Peer Review: **Jan 14, 2025**
Date of Acceptance: **Feb 13, 2025**
Date of Publishing: **Jul 01, 2025**