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# Collision of Malignant Melanoma and Squamous Cell Carcinoma in Rectum: First Report of a Rare Tumor

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## ABSTRACT

The term collision tumor is used to describe two neoplasms occurring in the same anatomic location with juxtaposition of different tumor elements. Such a coexistence of tumors anywhere in the body is relatively rare. We report a case of 32-year-old female with collision tumor of rectum. The tumor showed two distinct histological patterns with predominant component consisting of malignant melanoma and a minor component of squamous cell carcinoma. The morphological picture of collision was further confirmed by specific immunohistochemical profile of the two tumors. Collision tumors of rectum are uncommon with most of the reported cases comprising adenocarcinoma and neuroendocrine tumors. To the best of our knowledge this is the first case of collision tumor of malignant melanoma and squamous cell carcinoma in the rectum.

***Key Words:*** Collision tumor, Malignant melanoma, Rectum, Squamous cell carcinoma

## INTRODUCTION

Collision tumors are rare and are defined as two independent tumors with distinct morphology which occur concurrently at the same anatomic site (1). Although the pathogenesis of these tumors is debatable, they are thought to arise from two separate histogenetic events and need to be distinguished from composite tumors which consist of one tumor differentiating into two (2). Collision tumors do not show any significant admixture of the two tumor elements whereas there is prominent intermingling in composite tumors (3). Due to the absence of unique clinical features, histopathology alone helps in recognizing the dual components and making an accurate diagnosis. Immunohistochemistry and genetic analysis are useful aids for further corroboration. Recognition of both components in these tumors is important for appropriate management as the prognosis may be dependent on any one component. Collision tumors are uncommon in the body. Still rare are collision tumors of rectum with adenocarcinomas being the most common constituent. The other known components include neuroendocrine tumors and lymphomas (4,5). We report a case of collision tumor of rectum composed of malignant melanoma and squamous cell carcinoma (SCC).

## CASE REPORT

A 32-year-old female presented with chief complaints of fatigue, significant weight loss, rectal tenesmus and bleeding for last seven months. Her past history was unremarkable and family history was not suggestive of familial accumulation of any cancer. General physical examination showed pallor while a digital rectal examination revealed an irregular mass lesion in the rectum at 5-7 o'clock position. Laboratory investigations were within normal limits except for low hemoglobin of 9 gm/dl. Computed tomography (CT) scan revealed an endophytic growth in the distal part of rectum measuring 4x3cm. Tumor was extending proximally up to 2.2 cm from levator ani muscle and distally reaching up to the ano-rectal junction. There was no lymphadenopathy. Rectal biopsy was done which showed features of malignant melanoma on histopathology. Thorough clinico-radiological examination of the patient showed no evidence of primary malignant melanoma or a metastatic focus elsewhere in the body. Subsequently patient underwent abdomino-perineal resection of rectum. Although the patients post operative period was uneventful her condition deteriorated over the time and she expired 5 months after surgery.

Grossly, the rectum revealed a grayish black, nodular, friable tumoral growth with ulcerated mucosa measuring 4x3cm located 0.7cm away from the ano-rectal junction and 2cm from the distal resected margin (Figure 1). Tumor did not extend into the peritonealized segment. Microscopically, tumor was composed predominantly of oval to spindle shaped cells arranged in sheets and cords (Figure 2A, {M}). Moderate nuclear atypia, brisk mitosis (>10/10HPF) and abundant intracellular and extracellular brownish black pigment were noted (Figure 2B). Morphological features were of "Malignant melanoma". Tumor was ulcerating the overlying mucosa (Figure 2C) and infiltrating into the

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muscularis propria with sparing of serosa. Just adjacent to this tumor, a smaller component of well-differentiated squamous cell carcinoma was observed in the ano-rectal mucosa measuring approximately 6mm in diameter (Figure 2A,{S}). This was composed of malignant squamous cells infiltrating superficially into lamina propria as small nests (Figure 3A) and single atypical cells (Figure 3B). The two tumors were occurring side by side without any significant admixture. Squamous cell carcinoma component was seen in continuity with the anal mucosa. No perineural or lymphovascular invasion was evident. The surgical margins were free of tumor and fourteen lymph nodes isolated did not reveal tumor metastasis.

Immunohistochemical staining distinguished the two tumor components. Melanoma cells were immunoreactive for HMB-45 (Figure 4A) and S-100 (Figure 4B) while

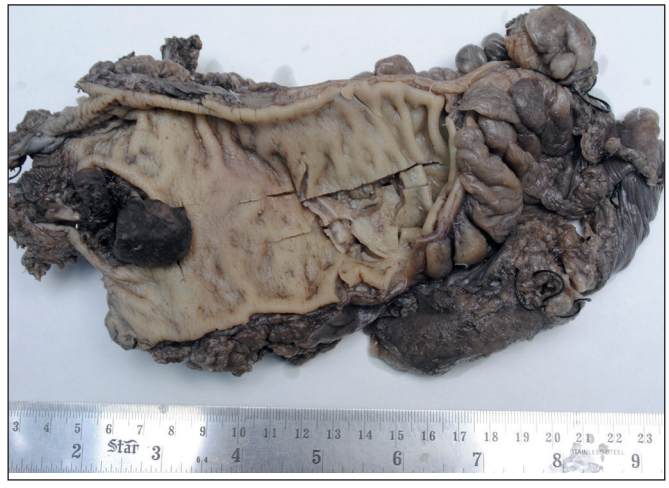

**Figure 1:** Gross photograph showing a nodular, black, friable growth in the rectum.

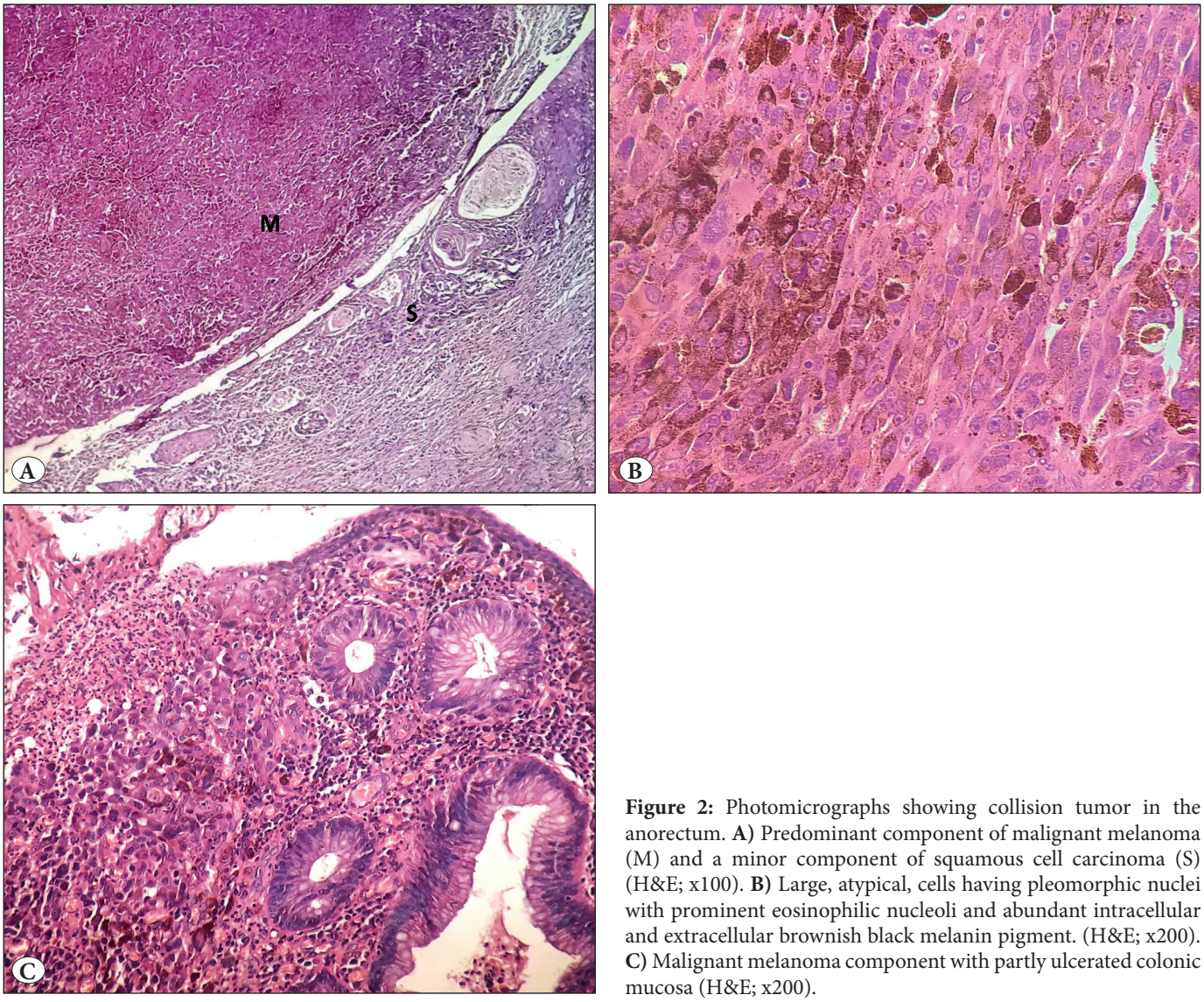


**Figure 2:** Photomicrographs showing collision tumor in the anorectum. **A)** Predominant component of malignant melanoma (M) and a minor component of squamous cell carcinoma (S) (H&E; x100). **B)** Large, atypical, cells having pleomorphic nuclei with prominent eosinophilic nucleoli and abundant intracellular and extracellular brownish black melanin pigment. (H&E; x200). **C)** Malignant melanoma component with partly ulcerated colonic mucosa (H&E; x200).

pancytokeratin (CK) was negative. Squamous cell carcinoma component was immunoreactive for CK (Figure 4C) and negative for HMB-45 and S-100. Thus, a diagnosis of collision tumor of rectum comprising malignant melanoma (T4N0M0) and squamous cell carcinoma (TisN0M0) was rendered.

## DISCUSSION

Collision can occur between tumors originating in the same organ or between metastases from other sites (2, 3, 6). Collision of two malignancies in rectum is rare with adenocarcinoma being the most frequent component admixed with either neuroendocrine tumor or lymphoma (4, 5). Mucosal melanomas constitute approximately 1.2% of all melanomas with those in anorectum accounting for less than 25% of malignant melanomas in the mucosa. These represent about 0.5% of all colorectal and anal cancers (7). Squamous cell carcinoma of the rectum is rare with an incidence rate of 0.1–0.25% per 1,000 cases (8). Simultaneous occurrence of malignant melanoma and SCC as in this case is uncommon and has been described mainly in the context of skin and oral cavity (9, 10).

Some authors believe that collision is merely a chance occurrence of two unrelated tumors (2).Others advocate that a common carcinogenic stimulus induces certain micro environmental changes leading to development of the second tumor (6). Other theories suggested are common origin from pluripotent cancer stem cell which differentiates into two components with simultaneous proliferation of two different cell lines (11). In our case, malignant melanoma was a predominant component and the changes produced by it in the milieu could have stimulated the immediately adjacent ano-rectal mucosa to undergo increased proliferation and neoplastic transformation into squamous cell carcinoma. Collision tumors need to be differentiated from composite tumors. The latter develop as a result of single mutation in the precursor cell with the clone undergoing a divergent differentiation at some point leading to formation of two neoplasms that are intimately mixed (3). On the other hand collision tumors result from two separate molecular events and exist without significant tissue admixture. Molecular studies provide evidence regarding the origin of tumor from the same or different clones. If two tumors arise independently, the genetic alterations are expected to be different from each other because of different tumor origins and vice versa (12, 13).

Due to rarity of these tumors the biological behavior is unpredictable and it is still debatable whether the most predominant or the more histologically aggressive component of the collision tumor will determine the prognosis. In our case, possibly the more aggressive and predominant melanoma component was the key determining factor in the final outcome which was the death of patient within a year of clinical presentation. Therefore, appropriate treatment strategies may ultimately be dependent on the individual biological aggressiveness of each of the tumor components.

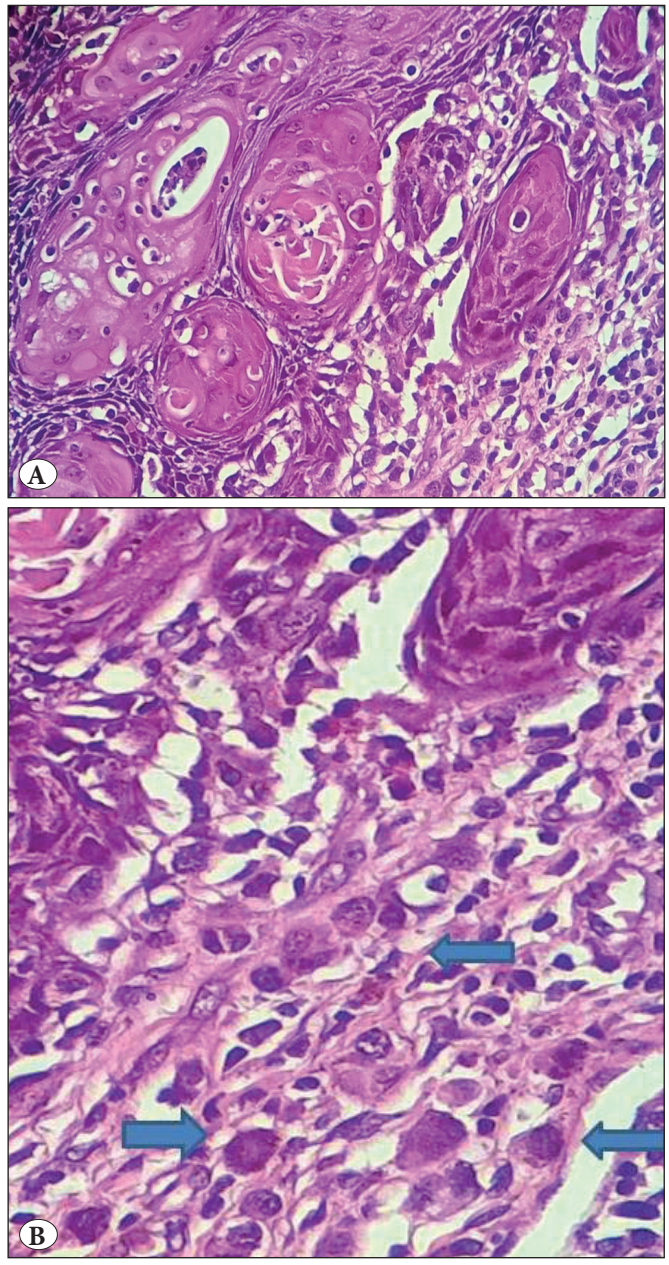


**Figure 3:** Photomicrographs showing squamous cell carcinoma component of the collision tumor. **A)** Nests of malignant squamous cells invading into lamina propria (H&E; x200).
**B)** Invasive front showing single tumor cell infiltration into lamina propria (arrows) (H&E; x400).

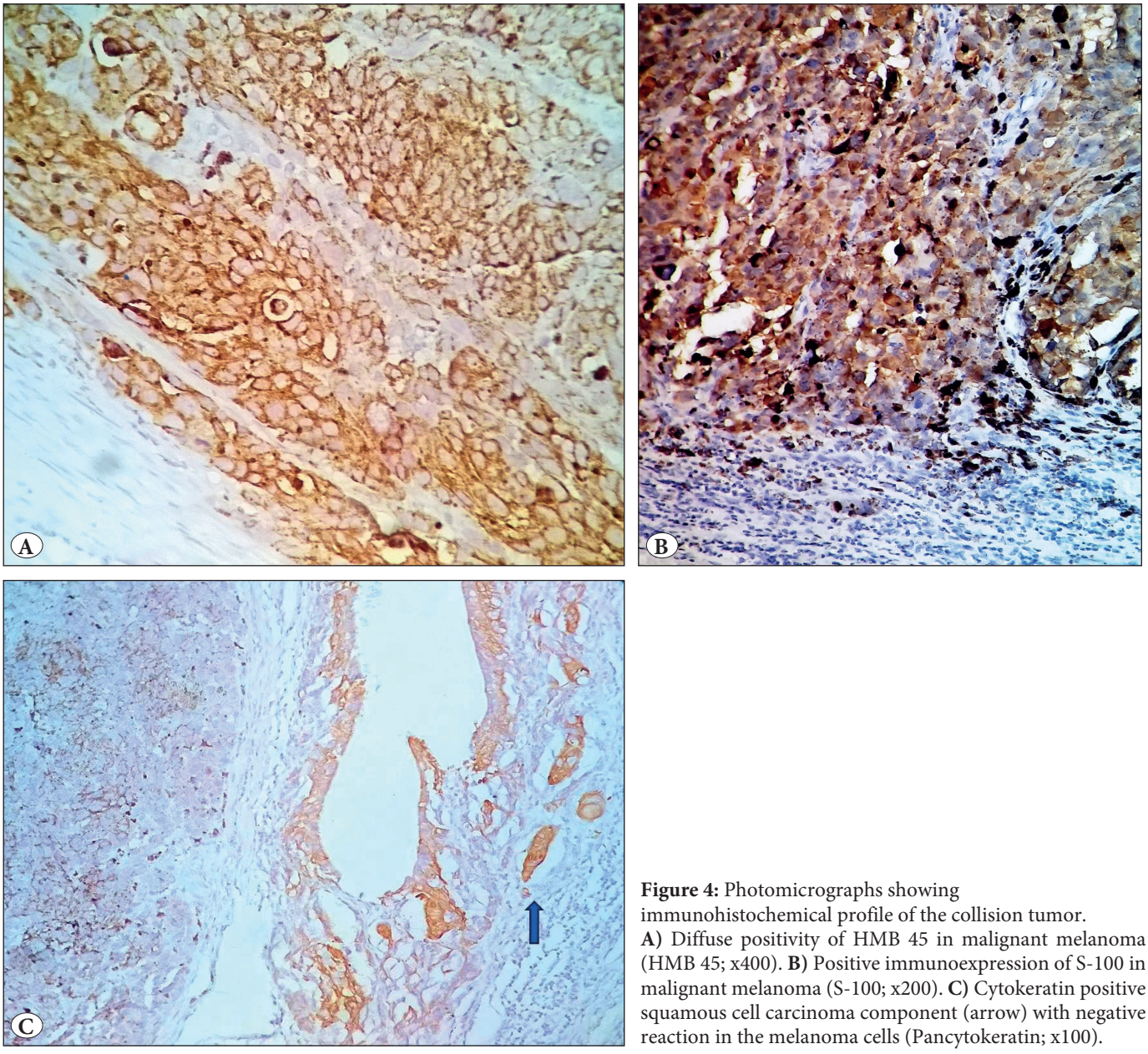


**Figure 4:** Photomicrographs showing immunohistochemical profile of the collision tumor. **A)** Diffuse positivity of HMB 45 in malignant melanoma (HMB 45; x400). **B)** Positive immunoexpression of S-100 in malignant melanoma (S-100; x200). **C)** Cytokeratin positive squamous cell carcinoma component (arrow) with negative reaction in the melanoma cells (Pancytokeratin; x100).

In conclusion, to best of our knowledge collision tumor of malignant melanoma and squamous cell carcinoma, rectum has not been described in English literature till date. This case report highlights the need for accurate identification of both components of the tumor for determining the overall prognosis and planning treatment strategies.

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