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Case Report

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Cutaneous scalp metastasis in renal cell carcinoma: A diagnostic challenge

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ABSTRACT

One of the more aggressive cancers that has the potential to spread to other body parts is renal cell carcinoma (RCC). The most frequent sites of metastasis are the lungs, liver, and bones. Reports of RCC spreading to the skin, especially the scalp, are uncommon. While RCC metastases to the scalp are rare, they should be taken into account because of their poor prognosis and great potential for spreading, thereby reducing life expectancy in humans. Here, we report a patient who was diagnosed with RCC and also had a metastatic scalp lesion.

Keywords: Renal cell carcinoma, Metastasis, Skin neoplasms, Scalp lesions, Head and neck tumors, Osteolytic lesions

1. INTRODUCTION

Renal cell carcinomas (RCCs), which arise in the proximal tubule epithelium of the kidney, account for 80–90% of kidney cancers [1]. The most common symptoms of a so-called triad are flank tumor, hematuria, and stomach pain [2]. Imaging tests find more than 70% of RCCs by coincidence. Approximately a third of all people get diagnosed with metastatic disease in RCC. The RCC can spread and has an aggressive behavior. The brain, adrenal glands, lungs, liver, bone, lymph nodes, and contralateral kidneys are the most frequently metastasized organs for RCC [3]. Reports of RCC spreading to the skin, especially the scalp, are uncommon [4]. Here we report a case with RCC and a metastatic scalp lesion.

2. CASE REPORT

A 53 – year-old male presented with scalp tumor for six months which measured 3.0 by 3.5 cm. The case was investigated by computed tomography (CT) which revealed a tumor destroying the cranial bone and extending to the scalp's soft tissues (Figure 2). Also, magnetic resonance imaging (MRI) was performed and showed a tumor located on the frontal bone (Figure 3). The patient underwent tumor excision under general anesthesia in the surgery department (Figure 1). Tissue specimen was received in 10% buffered saline in the Department of Pathology at Subharti Medical College.

Gross examination of the specimen received was 5 greyish white to greyish brown, soft to firm tissue pieces in the container labelled A. The largest tissue measured 7.2 x5.2 x3 cm. The smallest tissue piece measured 1.2 x1x 0.7 cm. The largest tissue piece on cut showed solid greyish white appearance. It had flaplike structures measuring 4.1 x3.6x1 cm. In container labelled B were received multiple greyish white to greyish brown, bony hard tissue pieces altogether measuring 2.8x1.4 x0.6 cm.

Microscopic findings of the specimen showed a partly encapsulated tumor; cells were found to be arranged in lobules and sheets, separated by varying thickness of fibrous septa. These septa showed mononuclear inflammatory cell infiltration and karyorrhectic material. Underlying muscles were focally infiltrated by tumor. Excised scalp tumor showed features of well differentiated sebaceous carcinoma.

Three months later, the patient was again admitted to the surgery department with the presence of mass in the kidney diagnosed on radiological imaging and underwent right nephrectomy. Histopathology of the nephrectomy specimen showed clear cells arranged into acinar and glandular structures. All findings were shown to be consistent with RCC (Fig 4).

Earlier hematoxylin and eosin-stained slides of the scalp tumor of this patient which was diagnosed as sebaceous carcinoma were reviewed again. Microscopic features of the sections revealed

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skin-covered, partly encapsulated tumor tissue composed of closely packed nests and sheets of large cells, having mostly centrally placed, vesicular to hyperchromatic small nuclei and well-defined cell borders. Intervening stroma was scant, delicate and of fibrovascular type. Areas of fibrosis were also seen. Revised diagnosis was made based on findings of the tumor mass from the scalp showing clear cell tumor, so a final diagnosis of metastatic RCC was made (Figure 5).



Figure 1. *Postoperative photo showing the tumor site after resection of the scalp mass*

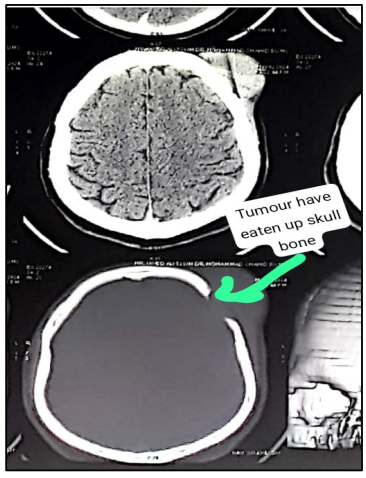


Figure 2. *Brain CT scan showing the tumor destroying the cranial bone and extending to the scalp's soft tissues*

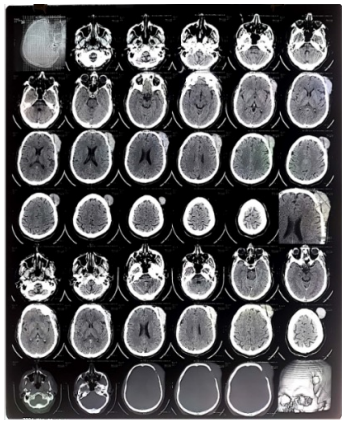
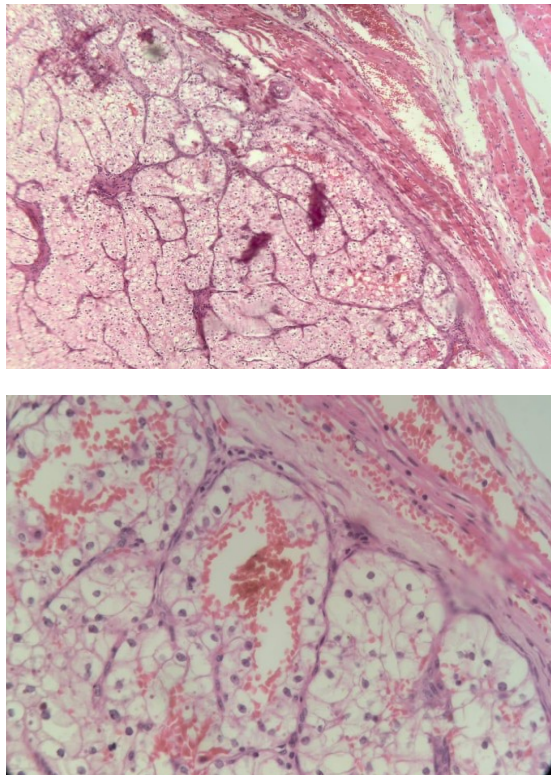
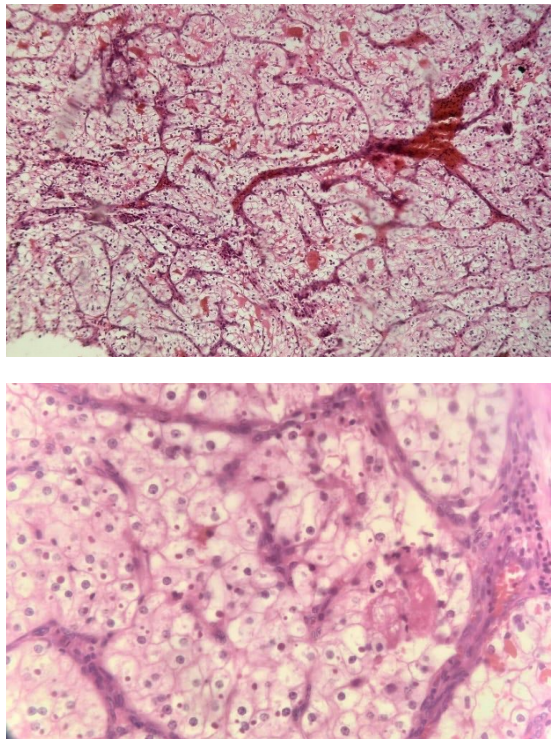


Figure 3. *MRI showing the tumor located on the frontal bone*



Figures 4. Skin biopsy showing tubulocystic tumor (H&-E x 10 and 20).



Figures 5. Kidney biopsy showing clear cell tumor (H&-E x 10 and 20).

3. DISCUSSION

The incidence of RCC peaks during the fifth and seventh decades, and it is more common in men (2:1) [5]. The incidence of RCC has increased recently, along with advancements in imaging techniques [6]. RCCs are found by accident during routine imaging in more than 70% of cases [7]. The brain, adrenal glands, lungs, liver, bone, lymph nodes, and contralateral kidneys are the main organs where RCC is known to spread [8, 9]. Metastases to the skin are unusual and less frequent according to previous studies and reviews [10-14]. It has been reported that less than 20 RCC cases have spread to the scalp, and fewer than 100 cases have spread to the skin [1, 5-12]. Although there are a number of ways that RCC spreads, hematogenous spread has been hypothesized as the primary mechanism behind it [15]. Venous circulations enable the tumor to spread to other areas [16]. The significant tumor emboli-induced dissemination to the renal vein or vena cava is one of the primary characteristics of RCC [6, 17]. Due to retrograde flow brought on by increased intrathoracic or intra-abdominal pressure, tumor emboli may have such venous dissemination [18]. Thus, RCC can spread to the skin, neck, and head; however, the precise mechanisms are yet unclear [19-21].

A radical nephrectomy and tumor excision of the skull are part of the standard of therapy for metastatic RCC [8, 22-25]. Presently, it is known that after the main lesion is removed, metastatic deposits go away [26-29]. Immunologic reactions have been reported to cause the complete spontaneous regression of bone and lung metastases following initial tumor excision [17, 30]. However, this claim has not yet been validated for RCC metastases to the head and neck [8]. After nephrectomy, patients with stage I RCC have a 5-year survival rate of approximately 90%, while the people with stages II and III have a 5-year survival rate of over 40% [23, 31]. If the malignancy has already invaded the renal vein or vena cava without spreading to other regions, surgical excision may present a chance for recovery [5, 32-35]. The prognosis is poor when there are cutaneous metastases [34]. RCC cannot be cured by hormone therapy, radiation, or traditional chemotherapy agents [35].

The differential diagnosis in our case included melanoma, angiosarcoma, Kaposi sarcoma, sweat gland tumor, sebaceous carcinoma, and other cutaneous cancers [24]. Both RCC, particularly the clear cell variant, and sebaceous carcinoma exhibit clear cytoplasm attributed to lipid and glycogen accumulation, resulting in histological similarities. Both tumors may display lobulated cell nests characterized by vacuolated cytoplasm and occasionally prominent nucleoli, complicating differentiation. RCC metastases frequently exhibit significant vascularity, a characteristic also observed in sebaceous carcinoma, albeit to a lesser extent. Clinical history, such as a known diagnosis of RCC, aids in guiding suspicion; however, it is not definitive. Cutaneous metastases may resemble various primary skin tumors; without histopathological and immunohistochemical confirmation, the risk of misdiagnosis exists. Initial morphology may suggest a diagnosis; however, due to the overlap with sebaceous carcinoma, additional analysis is necessary for a definitive diagnosis. Immunohistochemistry (IHC) is essential for definitive diagnosis. RCC markers that test positive include PAX8, CD10, the RCC marker, and vimentin. Support for the origin of RCC. EMA, adipophilin, and androgen receptor are frequently observed in sebaceous carcinoma [36, 37].

Even though cancer of the kidney metastases to the scalp are rare, they should be taken into account while assessing any unusual subcutaneous tumor in the scalp area [29]. Any unexpected lesion should be thoroughly investigated because metastases from the primary tumors elsewhere can occur at any time and show unpredictable clinical behavior [30]. When studying regions as unlikely as the scalp, RCC should not be dismissed.

Conclusion

We wrap up by discussing a case of RCC that spread to the scalp from the kidney. Because of their poor prognosis and high potential for spread, scalp metastases should be taken into consideration even though they are extremely uncommon. Regular follow-up is necessary to check for metastases, even in patients who have had a nephrectomy. Metastatic RCC is difficult to treat, and there is currently no established best course of action for producing a long-lasting response without causing significant side effects. Hence, understanding the clinical signs or symptoms of metastatic RCC is especially important because they may be the first warning of an underlying cancer.

Compliance with Ethical Standards:

This manuscript was conducted ethically in accordance with the principles of Helsinki World Medical Association Declaration.

Patient Consent: The patient gave his written consent for clinical information related to him to be reported in a medical publication.

Conflict of interest: The authors declare that there is no conflict of interest. Financial support: This study received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

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Authors contributions: KC: Conceptualization, case management, data collection, KS: Case analysis, literature review, manuscript drafting, AA: Supervision, critical revision of the manuscript, and expert guidance on case interpretation, SSHS: Data interpretation, literature search, and contribution to manuscript writing, AS: Literature review, data organization, and manuscript editing, SGS: Manuscript review, editing, and critical insights on case discussion, EE: Supervision, manuscript revision. All authors have read and approved the final version of the manuscript.

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