International Journal of Surgery Case Reports 96 (2022) 107367

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.elsevier.com/locate/ijscr

Case report

# An exceedingly rare simultaneous incidental occurrence of synchronous primary malignancies; Invasive Ductal Carcinoma and Renal Cell Carcinoma in a male - A Case Report

Omar Al Laham, MBBS [a,b,*], Fareed Atia, MD [a,b], Dana Ibrahim, MD [c], Jack Shaheen, MD [a,b], Bashir Hokouk, MS, MD [d,e]

[a] Department of Surgery, Al-Mouwasat University Hospital, Damascus, Syria
[b] Department of Surgery, Al Assad University Hospital, Damascus, Syria
[c] Tishreen University, Lattakia, Syria
[d] Damascus University, Damascus, Syria
[e] Department of Surgery, Al_Abbasieen Hospital, Damascus, Syria

ARTICLE INFO

*Keywords:*
Case Report
Synchronous Primary Malignancies
Male Breast Cancer
Renal Cell Carcinoma
Oncological Surgery
Incidental Diagnoses

ABSTRACT

*Introduction and importance:* Synchronous malignancies are defined as the emergence of one or more tumors which either occur simultaneously or within 6 months of each other. Populations older than 50 years of age are the most vulnerable. Documented prevalence rates of synchronous neoplasia are 4.5–11.7 %. To the best of our knowledge, ours is the first documented case of synchronous primary incidental occurrence of Invasive Ductal Carcinoma (IDC) and Renal Cell Carcinoma (RCC) in a Middle Eastern male. This type of co-occurrence must be borne in mind because such neoplastic occurrence is potentially fatal. Documentation is essential to raise awareness and to decrease the resultant morbidity and mortality.

*Case presentation:* We present a case of a 61-year-old male who presented to our clinic with a 22-day-history of gradual, painless, and disproportionate hypertrophy of his left breast. CT scan revealed incidental breast and right kidney masses. Therapeutic intervention included a modified radical mastectomy with Sentinel lymph node excision along with right radical nephrectomy.

*Clinical discussion:* Treatment of our patient was multimodal. Accurate radiological studying together with clinical examination helped us in making a diagnosis. Treatment options for this pathology consist of a combination of surgery and/or adjuvant therapy.

*Conclusion:* Synchronous IDC and RCC are an extremely rare co-occurrence, especially in males, particularly Middle Eastern males, and more specifically, those presenting asymptomatically as incidental findings. It is vital to further document and study such cases to establish innovative surgical techniques, screening modalities for males, and to overcome the consequential morbidity and mortality.

## 1. Introduction

The nomenclature "Synchronous malignancies" describes any primary malignant tumors that tend to occur simultaneously or within the first six months from the established diagnosis of the first primary neoplasm. This type of neoplastic co-occurrence is remarkably rare. Based on the current published data, the prevalence rate of such two or more primary malignancies ranges from 4.5 % to 11.7 % [1].

Well-defined critical criteria ought to be fulfilled so that we can firmly state that a case of double malignant tumor occurrence is a synchronous incidence. Firstly, both tumors should be dissimilar from each other in terms of histopathological analysis results. Secondly, any possibility that this co-occurrence is due to metastases should be excluded. Thirdly, vivid characteristics of malignant transformation are mandatory [2,3].

According to the published literature, several primary tumors could co-occur. However, breast cancer is the most predominant neoplasm that tends to arise with other primary tumors [4]. Furthermore, it is

* Corresponding author at: Department of Surgery, Al-Mouwasat University Hospital, Damascus, Syria.
*E-mail addresses:* 3omar92@gmail.com (O. Al Laham), dr.fareedatia@gmail.com (F. Atia), danaibrahim.ej@gmail.com (D. Ibrahim), jsbayern212@gmail.com (J. Shaheen), Mhmoodhokok@hotmail.com (B. Hokouk).

https://doi.org/10.1016/j.ijscr.2022.107367
Received 26 May 2022; Received in revised form 24 June 2022; Accepted 25 June 2022
Available online 30 June 2022

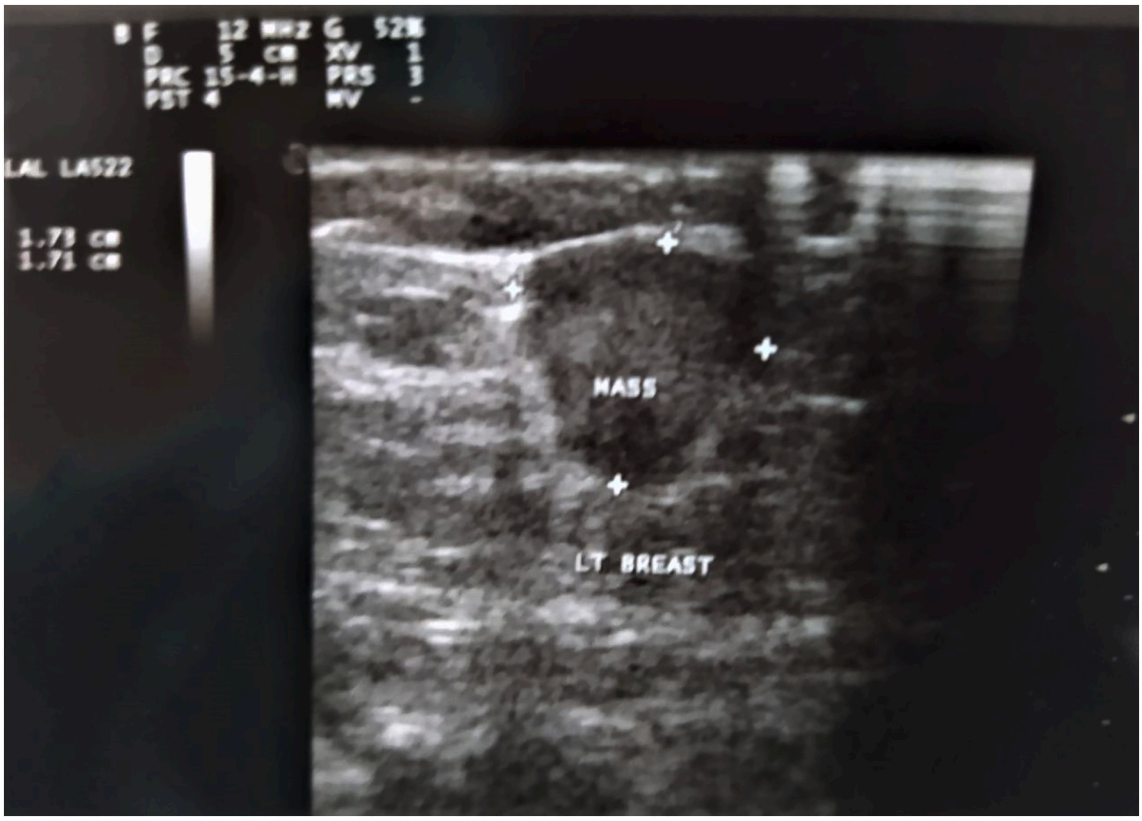


**Fig. 1.** Diagnostic breast Ultrasound revealed within the left breast, a hypoechoic retro-auricular mass was noted. Its borders were ill-defined and positioned at the 6 o'clock spot. The lesion measured approximately (1.73 × 1.71 cm).

upon review of the published literature, the co-incidence of breast cancer with another one or more distinct types of neoplasia have been established. These include tumors arising from the lung, colon, uterus, liver, and kidneys [5]. Moreover, the association of kidney tumors with a synchronous and/or metachronous malignancy has been documented in the literature [6,7]. However, synchronous co-occurring breast and renal neoplasia are exceptionally rare. The documented works of which are extremely scarce [5,6,8].

The work has been reported in line with the SCARE criteria and the revised 2020 SCARE guidelines [9].

## 2. Presentation of case

### 2.1. Patient information

Herein, we present the case of a 61-year-old Middle Eastern male, who is a known case of well-controlled Hypertension and Benign Prostatic Hyperplasia (BPH) for 10 years and 1 year, respectively. He was referred to our clinic from an Internal Medicine clinic as a possible case of gynecomastia. The patient presented to the General Surgery clinic complaining of an abnormal enlargement of his left breast. His history began 22 days prior to his outpatient visit when he noticed a painless increase in the size of his left breast. The patient did not report any visible overlying skin changes nor nipple discharge from said breast. His review of systems was negative except for classical complaints of a patient with BPH, such as terminal dribbling, feeling of incomplete void, straining, and poor urinary flow. He didn't report any visible discoloration of the urine nor pain during urination.

Our patient denied any loss of appetite, general fatigue, changes in bowel habits, night sweats, fever, malaise, or weight loss. His drug history comprised of classical medications for Hypertension and BPH without the use of Potassium-sparing diuretics. His surgical history only involved an open Appendectomy 15 years ago. The patient's family, allergic, and psychosocial histories were negative. He denied any exposure to arsenic compounds, irradiation, or chemotherapy. His Body Mass Index (BMI) was 29 kg/m$^2$.

### 2.2. Clinical findings

Physical examination of the patient was initiated by taking vital signs measurements. They were all within acceptable ranges for his age and hypertensive status. Upon inspection of the left breast, an asymmetrical hypertrophy of the left breast was evident. No overlying skin ulceration, discoloration, puckering of the nipple, or hyper-/hypopigmentation were noted. The inspection of the right breast was insignificant. Upon palpation, a relatively deep mass was felt. It was hard, mobile, with ill-defined borders, and not attached to the overlying skin. Additionally, there were no palpable ipsilateral and/or contralateral axillary lymph nodes. Laboratory investigations indicated mild anemia (Hb: 12 g/dl). Otherwise, the rest of the tests yielded normal results.

### 2.3. Diagnostic assessment

Diagnostic breast Ultrasound was done and revealed a hypoechoic retro-auricular mass within the left breast. Its borders were ill-defined and positioned at the 6 o'clock spot. The lesion measured (1.73 × 1.71 cm) (Fig. 1). Mild bilateral axillary lymphadenopathy was demonstrated. Said lymph nodes' morphological features were highly suggestive of a reactive etiology rather than a neoplastic one. Furthermore, the biggest lymph nodes measured (1.4 × 0.6 cm) and (1.5 × 0.7 cm) in the right and left axillae, respectively. Ultrasound of the right breast yielded normal results.

Therefore, Ultrasound-guided Tru-Cut biopsies were taken. Their analysis revealed an Invasive moderately-differentiated Ductal

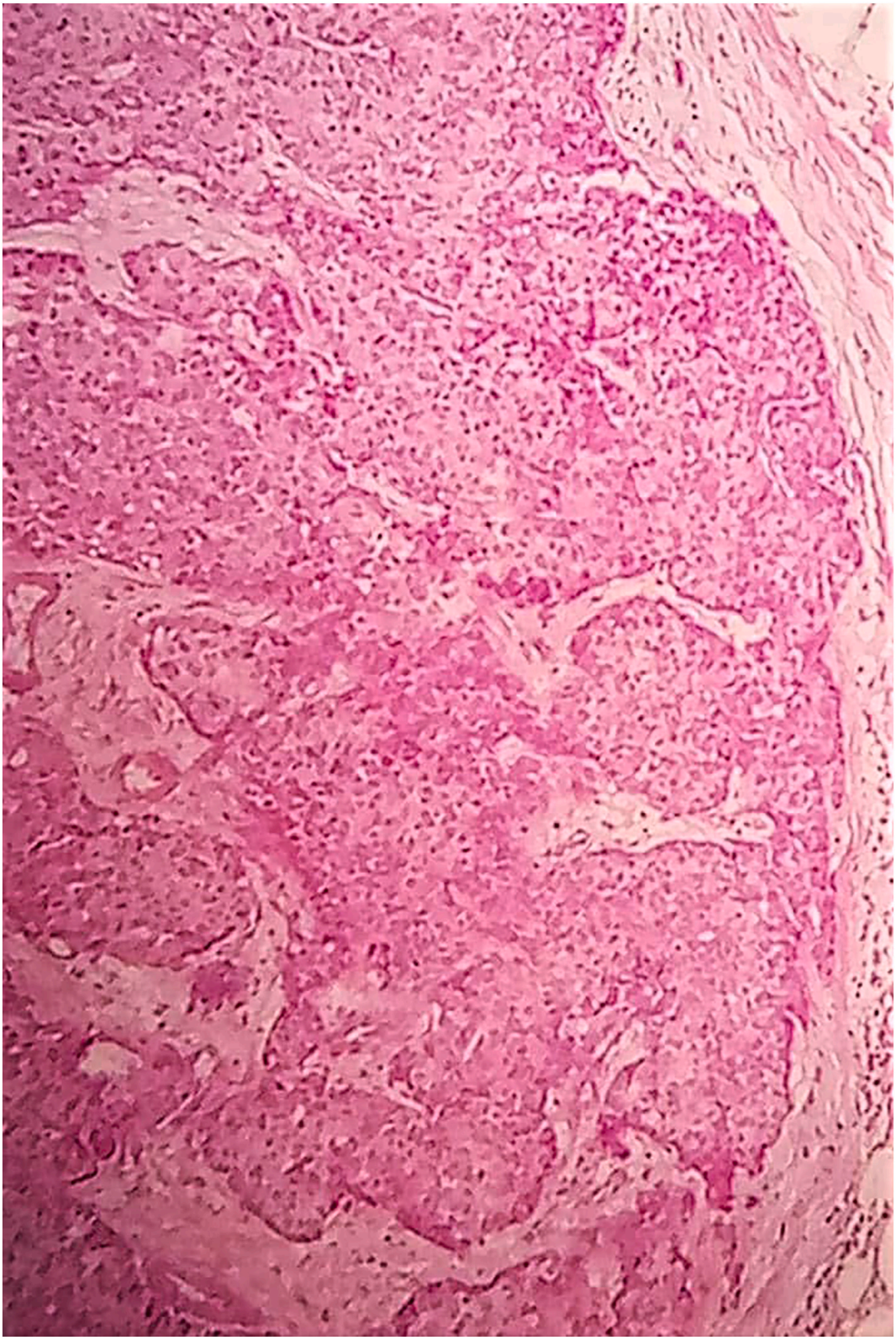

**Fig. 2.** Histopathology H&E staining of the preoperative ultrasound-guided Tru-Cut biopsy which revealed an Invasive moderately-differentiated (Grade 2) Ductal Carcinoma.

Carcinoma (Grade 2) (Fig. 2). Furthermore, immunohistochemical staining of the biopsies was done. It revealed that the tumor is positive for Estrogen Receptors (ER) in 80 % and for Progesterone Receptors (PR) in 90 % of the tumor cells. However, it stained negative for HER2-Neu (c-erB-2).

Finally, the Ki67 proliferation index was 5 %. This indicated a low mitotic index.

To complete the preoperative radiological assessment, a Computed Tomography (CT) scan was performed to rule-out any possible metastasis. If present, this could significantly alter the therapeutic approach

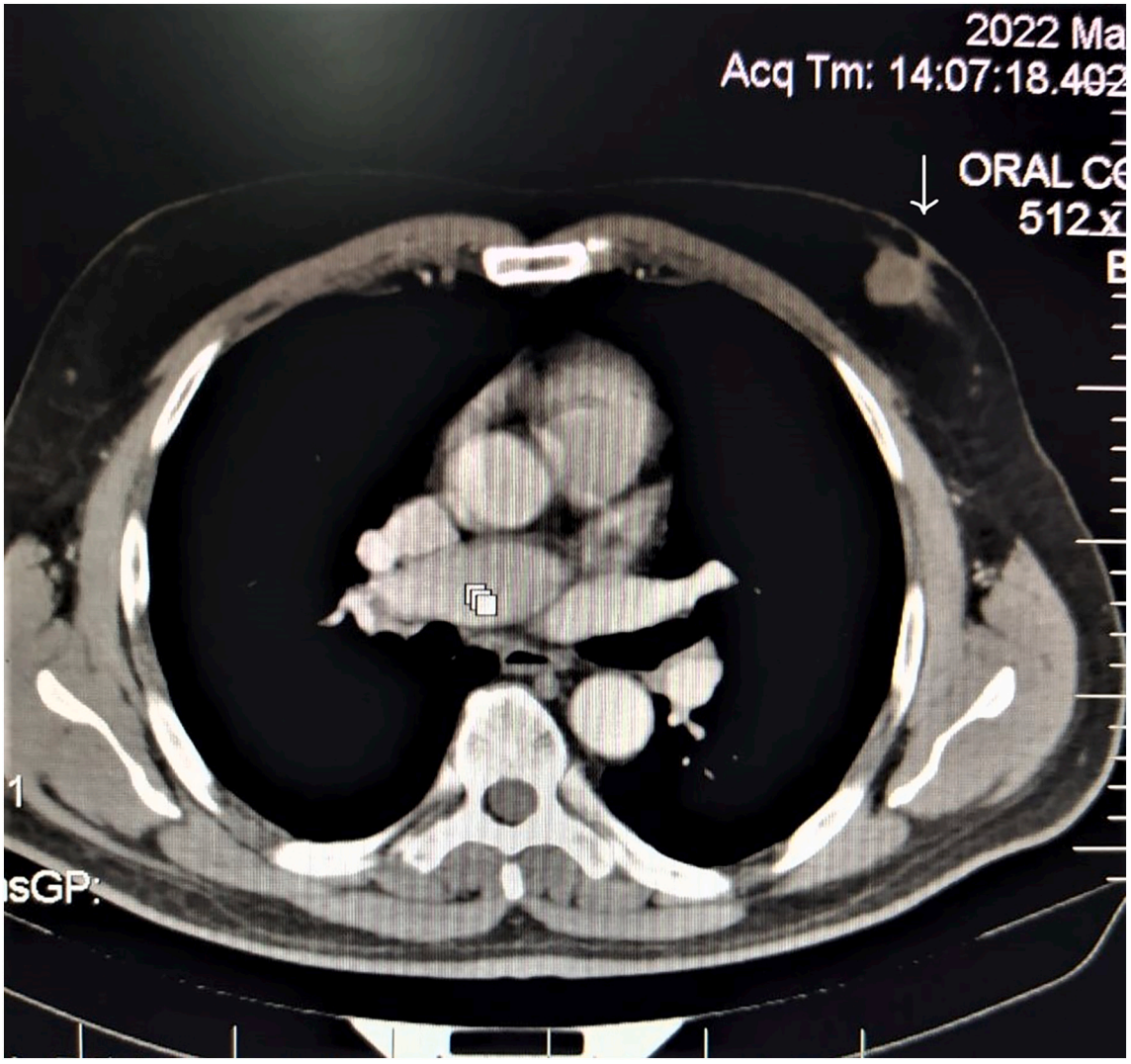


**Fig. 3.** Preoperative CT scan cross-sectional view, revealed a primary left breast retro-auricular mass measuring approximately (2.2 × 2.5 cm) with no evident lymphadenopathy (*Arrow*).

from a classical surgery to the possible utilization of adjuvant therapy.

CT scan revealed a primary left breast retro-auricular mass measuring (2.2 × 2.5 cm) with no evident lymphadenopathy (Fig. 3). On the other hand, a radiant mass in the superior pole of the right kidney was revealed and measured (6 × 7 cm) (Fig. 4A-B).

The latter result indicated a Renal Cell Carcinoma (RCC). No invasion of any surrounding structures was seen. Fortunately, the remaining vital organs like the bladder, liver, spleen, pancreas, and adrenal structures were radiologically free of neoplastic involvement (Fig. 5).

Preoperative preparation included the establishment of a large-bore Intravenous (IV) access, prophylactic IV antibiotics, and thorough laboratory panel for blood sampling and crossmatch.

A notable challenge was the patient's low socioeconomic status which prevented him from undergoing further complex imaging such as Magnetic Resonance Imaging.

### 2.4. Therapeutic intervention

Based upon a preoperative consultation from an oncology specialist, surgical intervention with Sentinel lymph node excision was advised. The procedures were successfully achieved at a tertiary hospital. They were performed by a senior General Surgery first assistant and by a General Surgery consultant with 5 years and 25 years of General Surgery experience, respectively. Furthermore, the surgeries were completed under general anesthesia with no perioperative complications. We excised the right kidney mass first and then the left breast mass. A laparoscopic surgical intervention via 5 Trocar incisions was preferred to perform the radical nephrectomy. Intraoperative findings confirmed those of the preoperative CT scan (Fig. 6). Therefore, right radical nephrectomy along with the mass was done through a transverse right subcostal margin incision. Unfortunately, the adrenal tissue had to be excised due to its tight attachment to the neoplastic mass. The excised specimens were sent to the histopathology lab for analysis.

Moving on to the left breast mass, a spindle incision was done, and Methylene Blue dye was injected. We waited for 15 min to allow the dye to go through. Afterwards, a modified radical mastectomy was performed (Fig. 7). Furthermore, the Sentinel lymph node was excised from the left axilla. Both excised specimens were sent for frozen section analysis. The results of which revealed that the margins of the left breast and the lymph nodes were free of tumor infiltration. Postoperative histopathological final analysis confirmed the presence of an Invasive moderately-differentiated Ductal Carcinoma (IDC, Grade 2) with no lymph node involvement (Fig. 8A-B). pTNM staging was pT2N0Mx, Stage IIa according to the American Joint Committee on Cancer (AJCC). Additionally, analysis of the excised right kidney specimens confirmed the diagnosis of a synchronous low-grade Renal Cell Carcinoma (Clear

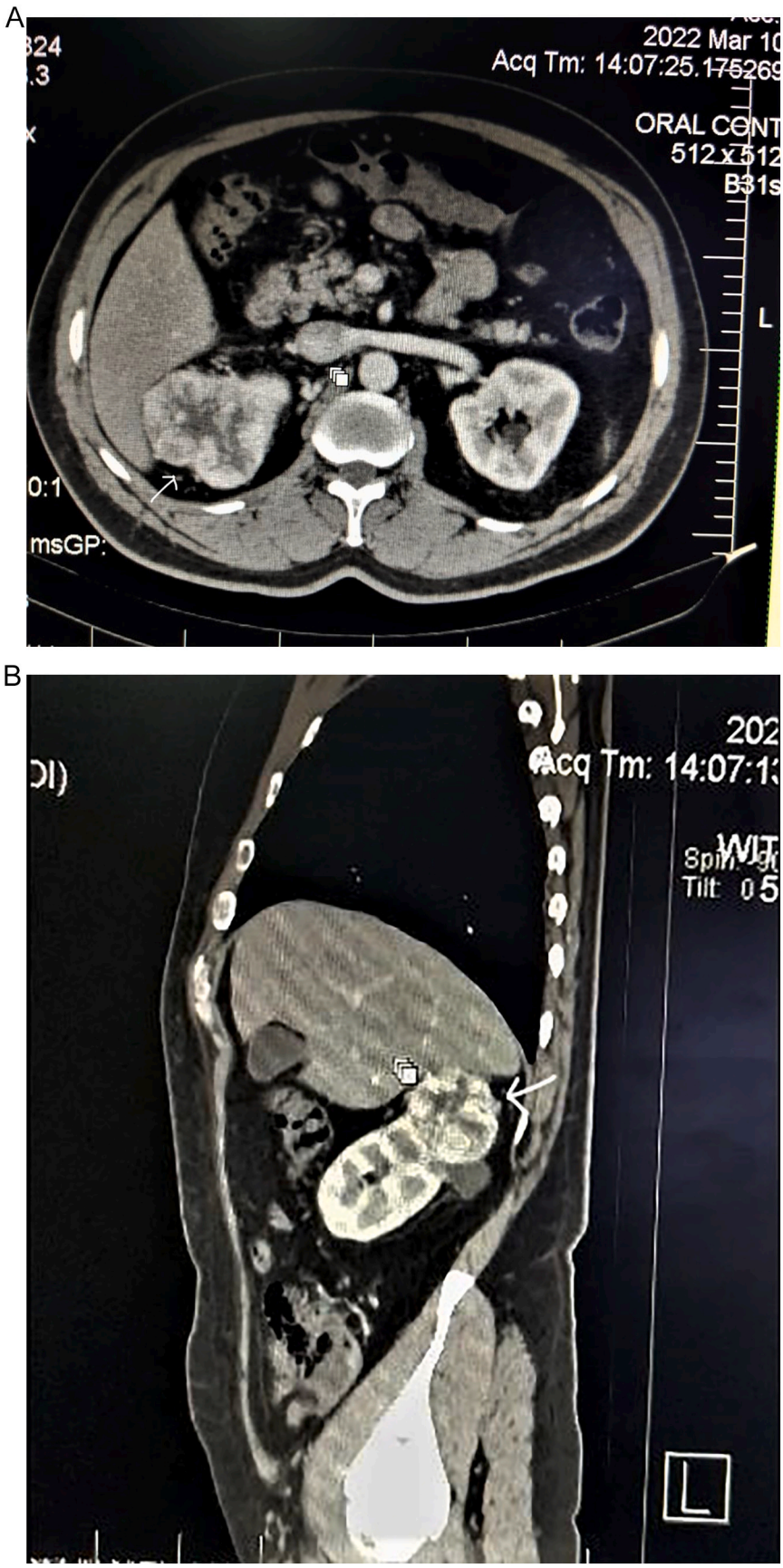


**Fig. 4.** (A-B): Preoperative CT scan cross sectional and sagittal views respectively, revealed a radiant mass in the superior pole of the right kidney was noted and measured (6 × 7 cm). This is clarified by the (*Arrow*).

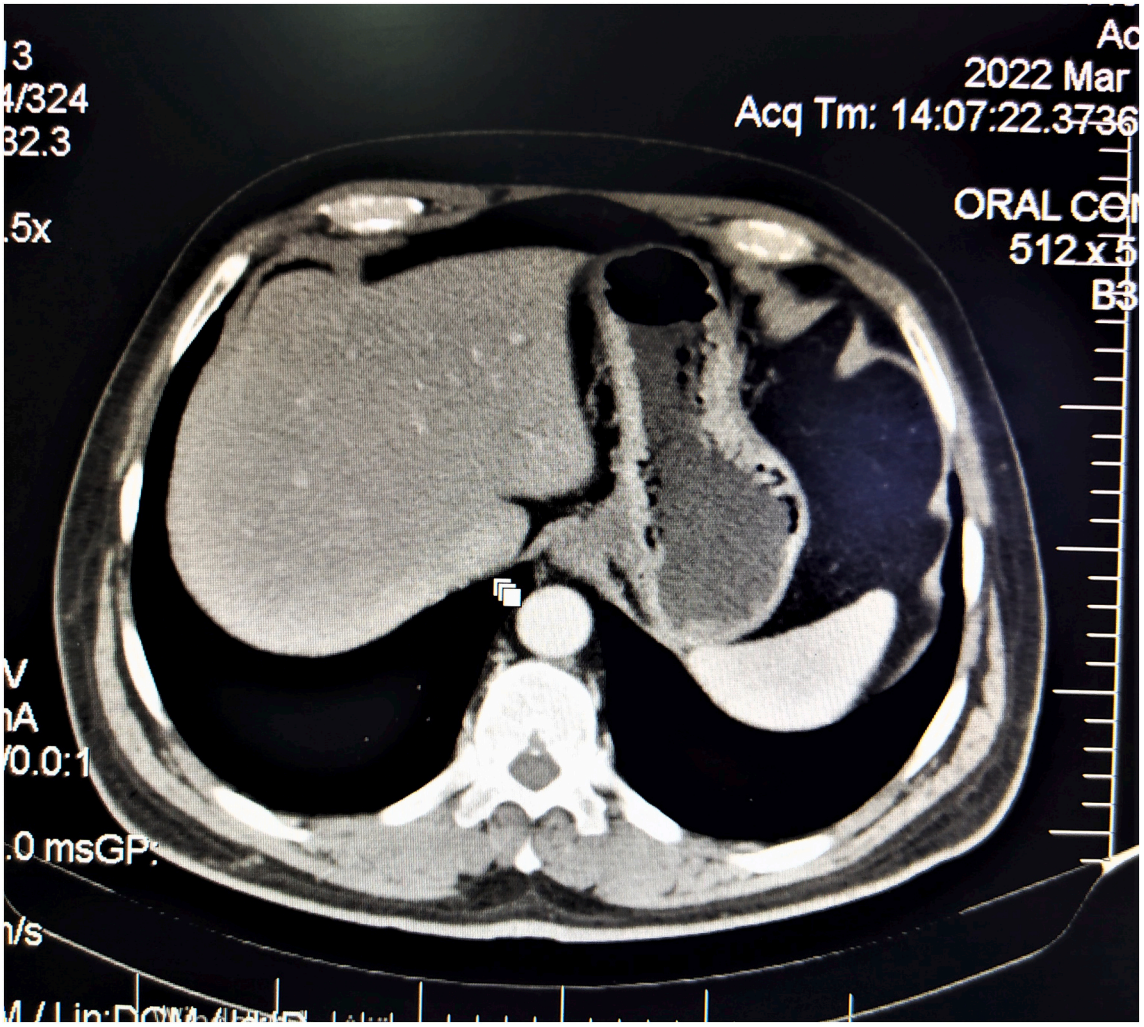


**Fig. 5.** Preoperative CT scan cross sectional view revealed no invasion of vital organs such as bladder, liver, spleen, pancreas, and adrenal structures.

Cell type, Fuhrman Grade 2) (Fig. 9A-B-C). pTNM staging was (pT3NxMx, Stage III according to AJCC). Furthermore, the excised adrenal tissue was free of neoplastic involvement.

Our patient underwent successful postoperative recovery. He was discharged home within two days of his surgery. Nonetheless, he was fully informed of the nature of his illnesses. Postoperative regular sterile wound dressings were applied, and a regimen of postoperative antibiotics were given to aid in wound infection prophylaxis. The patient was referred to an Oncology specialist to undergo the necessary postoperative therapeutic regimens. He has had regular scheduled follow-up appointments at the General Surgery clinic for 3 months now. During which, he underwent thorough physical examination and radiological imaging. All of which were within normal.

## 3. Discussion

Billroth was the pioneer who first put Multiple Primary Malignant Tumors (MPMTs) into the literature [10]. Consequently, they were later fully described by Warren and Gates in their research in 1932 [11].

As a result, Warren and Gates set-up certain criteria which should be fulfilled before stating that multiple co-occurring neoplasia are MPMTs. Firstly, both neoplasia should be dissimilar from each other in the pathological analysis. Secondly, any possibility that this co-occurrence is due to metastases should be excluded. Thirdly, vivid characteristics of malignant transformation should be present [2,3]. Our case fully satisfies these criteria.

"Synchronous malignancy" was then accurately defined by Gluckman as any malignant tumors which either present simultaneously or within the first 6 months of the time of diagnosis of the first primary malignancy. Any time beyond that 6 months milestone, those tumors will be labeled as "Metachronous malignancy" [12].

Our case is a synchronous type because both tumors were diagnosed incidentally at the same time upon our patient's clinical presentation.

This combination of neoplastic co-incidence is extremely rare. Based on the current literature, the prevalence rate of such two or more primary neoplasia ranges from 4.5 % to 11.7 % [1].

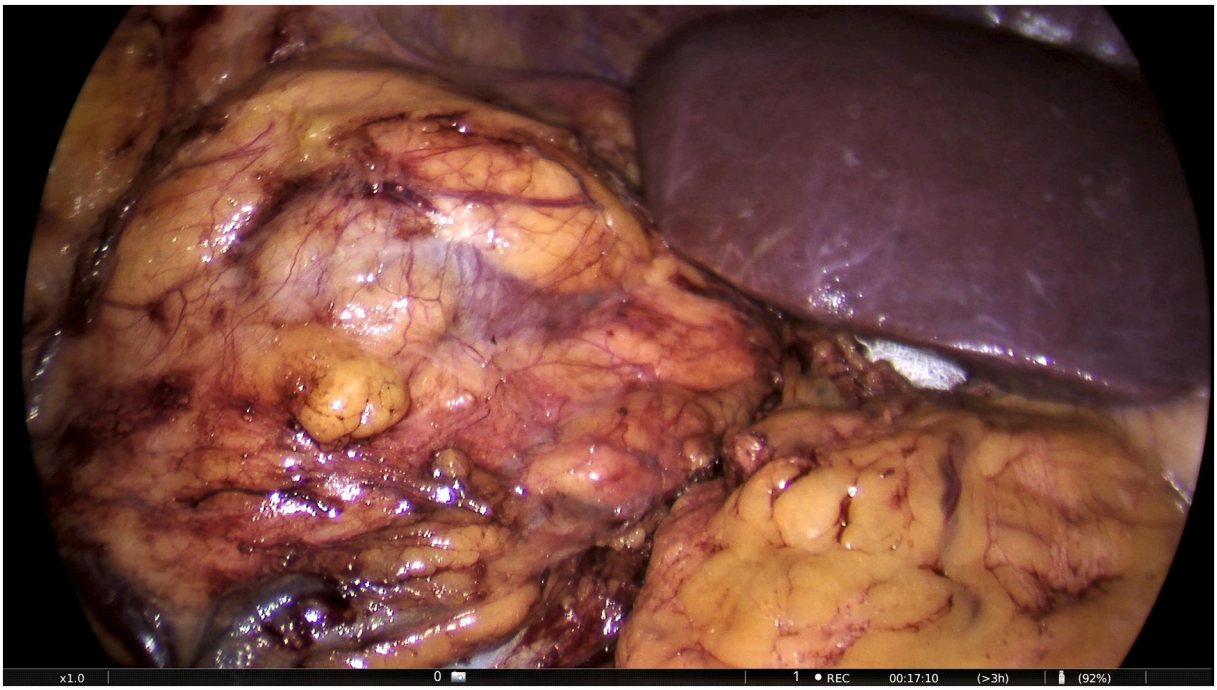


**Fig. 6.** Intraoperative laparoscopic image depicting the vivid Renal Cell Carcinoma of the right kidney.

Other important aspects include the incidence locations. Based on occurrences sites, tumors can be categorized into four different types. Firstly, we have the multicentric type. This is labeled if 2 different malignancies originate from the same organ. Secondly, we have the systemic type. This is assigned if those malignancies originate from functionally or anatomically related organ tissues of the same organ system (i.e., rectal and colon neoplasia). Thirdly, we have the paired organ neoplasia, such as the bilateral breast tissues. Fourthly, we have the random type. This is used to label distinct malignancies that take place incidentally in functionally and anatomically unrelated organs [13].

Our case is that of the latter type because the IDC and the RCC originated in two unrelated organ sites and were completely distinct from one another.

The pathogenesis of MPMTs is still a subject of controversy and is still poorly understood. Possible etiological factors include environmental ones, such as alcohol, tobacco, exposure to ultraviolet light, contrasting varieties of pollution, certain occupational duties that involve exposure to carcinogenic compounds, genetic predisposition, chemotherapy, radiation exposure, hormonal dysregulations, and gender-specific elements [8].

With regards to the age-related incidence rates, MPMTs can present in any age group. On the other hand, multiple literature studies revealed that MPMTs occur in patients who are usually older than the ones who suffer from a solitary primary neoplasm. Furthermore, most published articles suggest that >75 % of diagnosed patients belong to the population group who are older than 50 years [14–16].

As for gender prevalence, review of the literature revealed that males are more predominantly affected than females with regards to synchronous and metachronous neoplastic occurrences [17,18].

Synchronous breast and renal neoplasia are profoundly rare. Documented works of which are extraordinarily scarce [5,6,8]. Jiao et al. set-up an interesting article where they demonstrated a prevalence rate of 13.1 % of synchronous primary breast neoplasia with RCC. Furthermore, most of those cases were of a non-metastatic RCC accompanied by receptor positive IDCs. Said patients were treated via complete surgical excision for both types of neoplasia. This was followed by chemo-/radiotherapy in conjuncture with hormonal therapy [19,20].

With regard to synchronous IDC and RCC, we could only find 2 cases in the published literature. The first one involved a renal mass diagnosed as an incidental finding during the radiological testing of an originally diagnosed breast lesion [6]. The second one was reported by A. Elgazar et al. where they incidentally diagnosed a patient with an RCC three months after they operated on him for a breast IDC [21].

Both previously mentioned cases were of female patients and of different ethnicities than that of our patient's.

Our case is unique and possibly the first documented one of its kind because we diagnosed a simultaneous incidental occurrence of synchronous primary IDC and RCC in a Middle Eastern male. No previous similar cases were found in our review of the published literature. It is unique because the detection of tumors was incidental for both synchronous IDC and RCC, the patient is a male, and of Middle Eastern ethnicity.

The definitive diagnosis is reached via histopathology. Moreover, it is paramount that accurate histopathological analysis of resected specimens takes place so that we can exclude any possible metastasis and demonstrate the variation of each tumor.

Therapeutic plans can get altered once a tumor metastasizes. This happens especially when a tumor sends-off metastatic neoplastic cells into the other primary co-occurring tumor. This highlights the

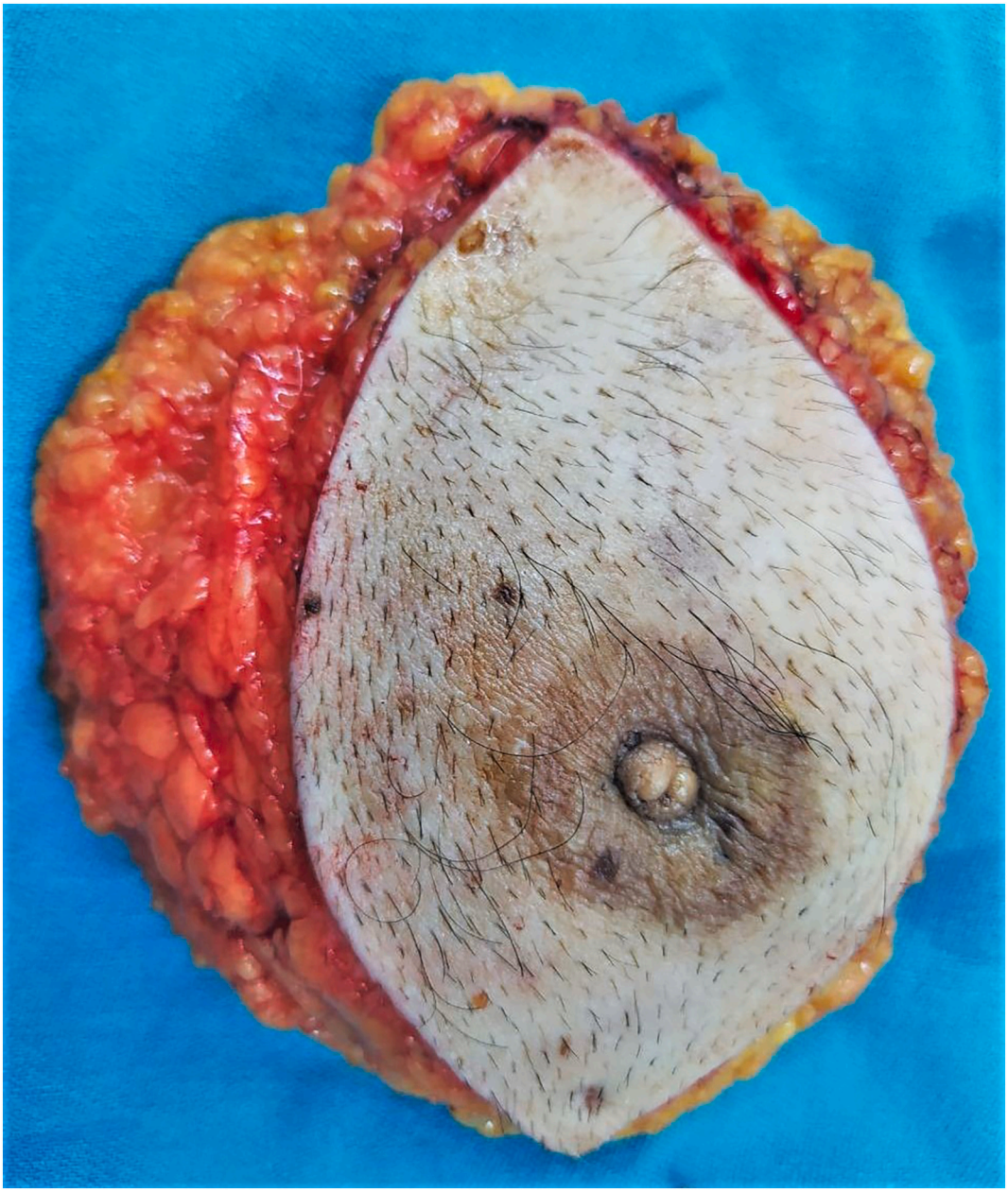

**Fig. 7.** Postoperative image depicting the excised breast along with its retro auricular mass.

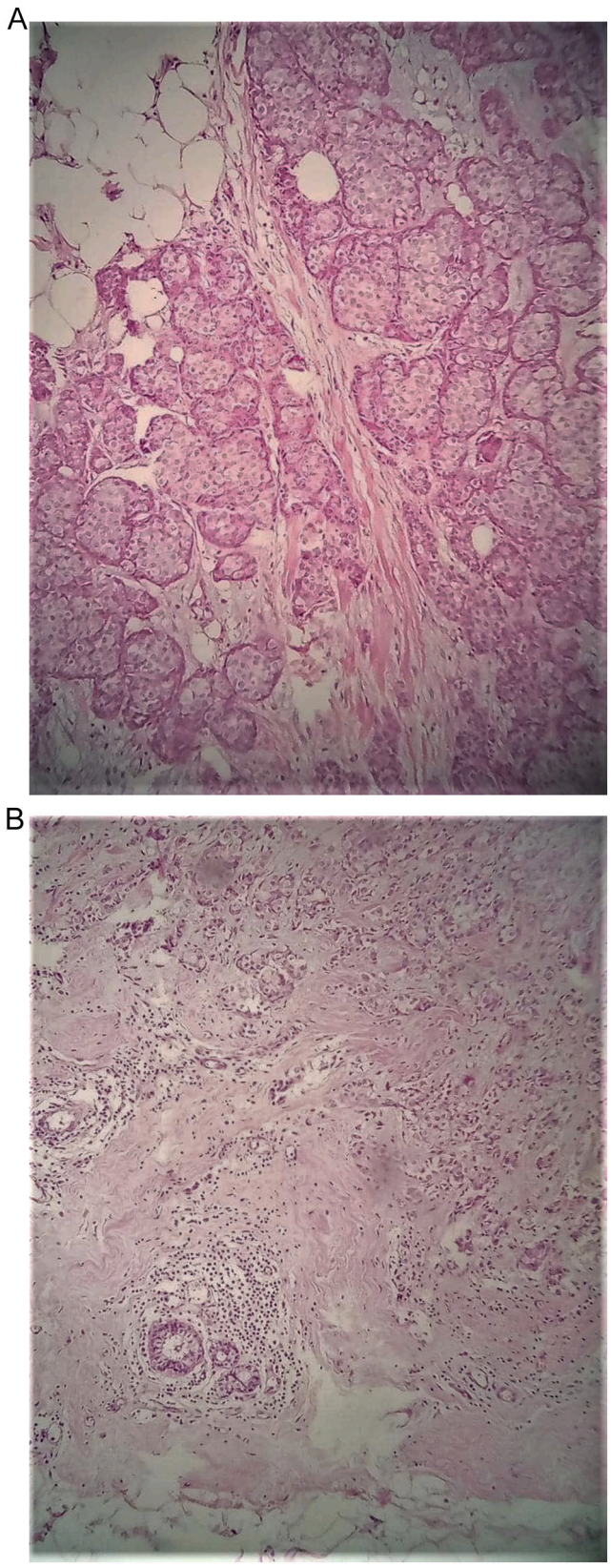


**Fig. 8.** (A-B): Postoperative histopathological analysis H&E staining revealed an Invasive moderately-differentiated (Grade 2) Ductal Carcinoma.

importance of thorough histopathological examination [22,23]. Therefore, we highlight the significance of the Tru-Cut, frozen section, and final specimen samples performed for our patient. These yielded a solid diagnosis and helped the patient receive the optimal treatment.

From a therapeutic standpoint, the huge risk posed by MPMTs resulted in the existence of multiple treatment approaches which have shown different levels of efficacy [24].

In a prominent research study by Lee et al., two separate neoplastic regional excisions yielded better results than wide and extensive excision [25]. This is what we have performed in our case.

From the perspective of the renowned AJCC, the 5-year cancer survival rates of RCC were explained. They set their results based on tumor stage. The percentages are 91 % for Stage I, 74 % for Stage II, 67 % for Stage III, and 32 % for stages IV [26]. Our patient is classified under the 67 % survival category because his RCC was determined to be a Stage III according to the AJCC classification system.

To conclude the prognostic prediction, Fuhrman suggested an adequate grading system that predicts the 5-year survival rates for RCC. It is independent from tumor stage. The percentages are 89 % for Grade 1, 65 % for Grade 2, 46 % for neoplastic Grades 3 to 4 [26]. Our patient is categorized under the 65 % category, because his RCC was determined to be Grade 2 under Fuhrman's classification.

On the other hand, breast cancer in males possesses worse prognosis than that in females. This is because breast cancer in men conventionally presents at later stages than those in women. Nevertheless, its prognosis with regards to staging is almost identical between males and females [27]. The 5-year survival rates for male breast cancer according to stage are 55 %–100 % for Stage I, 41 %–78 % for Stage II, 16 %–57 % for Stage III, and 0 %–14 % for Stage IV [28,29]. Our patient is categorized under the Stage II 5-year survival rate.

## 4. Conclusion

It is extremely rare to diagnose an incidental synchronous occurrence of primary IDC and RCC in a male patient, specifically a Middle Eastern male. To the best of our knowledge, we believe that this is the first documented case of a simultaneous incidental diagnoses of Synchronous primary IDC and RCC in a male in general, and more specifically a Middle Eastern male.

Breast cancer screening and treatment have become a turning point in the contemporary medical field. It is intensely scarce to have such a neoplasm in males and even rarer to have it accompanied by an RCC. Misdiagnoses yield catastrophic results for patients. This warrants high clinical suspicion and timely therapeutic intervention. Shedding light on primary IDC and RCC is vital, and it is more crucial when they're synchronous. Documentation of such occurrences will help the surgical and epidemiological communities in establishing preoperative screening methods, conduct better research, demarcate incidence and prevalence rates, and improve intraoperative surgical techniques. This minimizes the morbidity and mortality resultants from this rare co-occurrence. It will also aid in establishing adequate postoperative patient surveillance protocols to guarantee patient recovery and to decrease the chance of recurrence.

## Abbreviations

| | |
|---|---|
| IDC | Invasive Ductal Carcinoma |
| RCC | Renal Cell Carcinoma |
| BPH | Benign Prostate Hyperplasia |
| BMI | Body Mass Index |
| ER | Estrogen Receptors |
| PR | Progesterone Receptors |
| CT | Computed Tomography |
| IV | Intravenous |
| AJCC | American Joint Committee on Cancer |
| MPMTs | Multiple Primary Malignant Tumors |

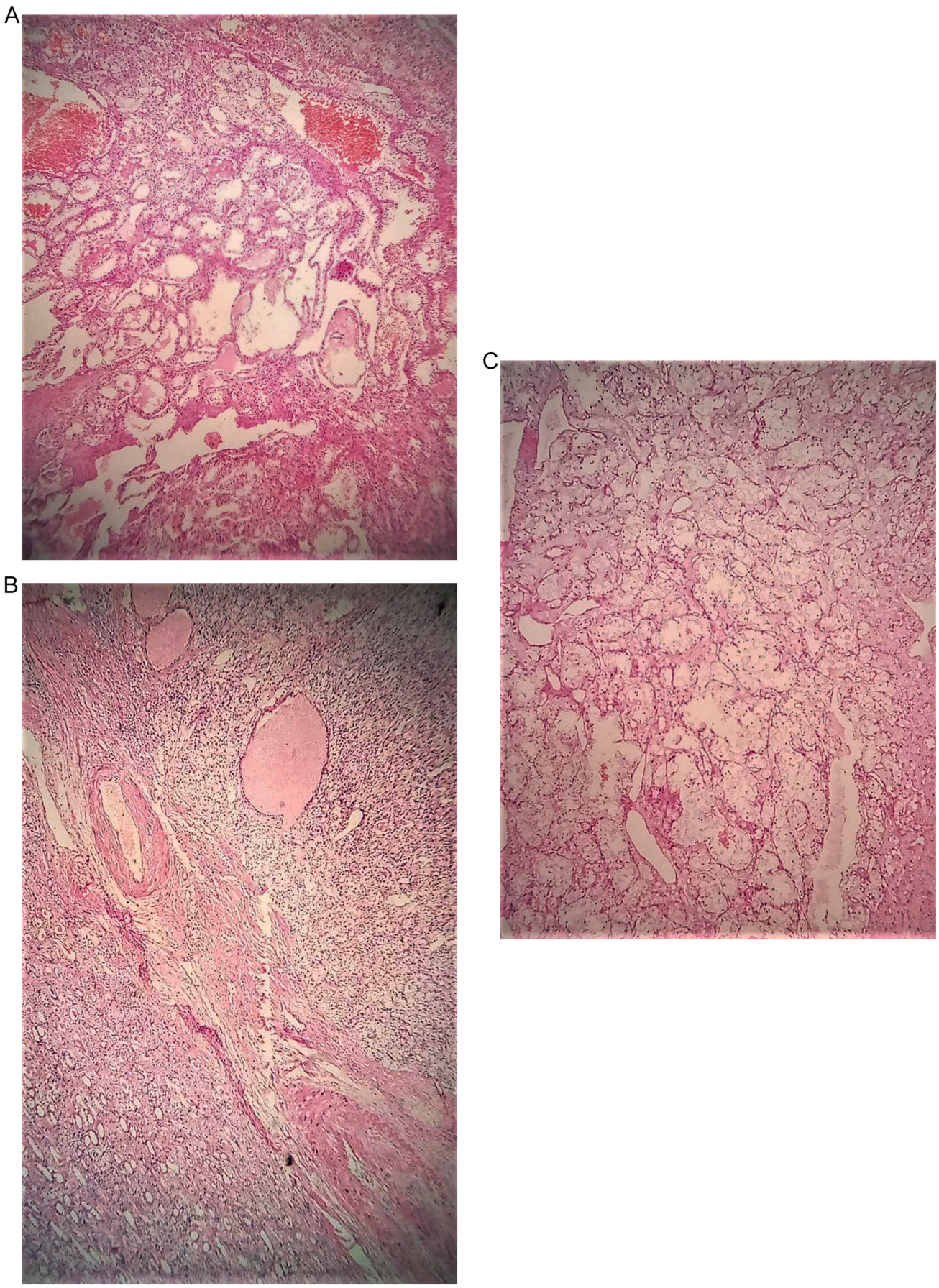


**Fig. 9.** (A-B-C): Postoperative histopathological analysis H&E staining revealed a low-grade Renal Cell Carcinoma (Clear Cell type, Fuhrman Grade 2).

## Ethical approval

This study is exempt from ethical approval in our institution.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Author contribution

OA: Conceptualization, resources, who wrote, original drafted, edited, visualized, validated, and literature reviewed the manuscript.

FA: Supervision, project administration, resources, and review of the manuscript.

DI: Review of the manuscript.

JS: 1st surgical assistant in the operations performed, supervision, project administration, resources, and review of the manuscript.

BH: General Surgery consultant who performed and supervised the operations, supervision, project administration, and review of the manuscript.

OA: The corresponding author who submitted the paper for publication.

All authors read and approved the final manuscript.

## Availability of data and materials

The datasets generated during and/or analyzed during the current study are not publicly available because the Data were obtained from the hospital computer-based in-house system. Data are available from the corresponding author upon reasonable request.

## Sources of funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Research registration

Not applicable in our case.

## Guarantor

Omar Al Laham.

## Declaration of competing interest

The authors declare that they have no competing interests.

*Acknowledgements*

-Dr. Ghaidaa El Saddik, MD. For her exemplary role in the visualization, validation of the vitality of the pathology, and her meticulous review of the references and the final manuscript. Her remarkable work ethic can only be matched by her continuous aspiration to make patients' lives better. Your vision and your legacy are everlasting.

-Maher Nassar's Histopathology laboratory, Damascus, Syria. For their role in the histopathological diagnosis of the excised specimens.

*Provenance and peer review*

Not commissioned, externally peer-reviewed.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijscr.2022.107367.

## References

[1] A. Irimie, P. Achimas-Cadariu, C. Burz, E. Puscas, Multiple primary malignancies - epidemiological analysis at a single tertiary institution, J. Gastrointestin. Liver Dis. 19 (2010) 69–73. PMID: 20361078.

[2] A. Aydiner, A. Karadeniz, K. Uygun, Multiple primary neoplasm at a single institution: differences between synchronous and metachronous neoplasm, Am. J. Clin. Oncol. 23 (2000) 364–370, https://doi.org/10.1097/00000421-200008000-00011.

[3] K. Derwinger, B. Gustavsson, A study of aspects on gender and prognosis in synchronous colorectal cancer, Clin. Med. Insights Oncol. 5 (2011) 259–264, https://doi.org/10.4137/cmo.s7871.

[4] R. Munker, S. Grützner, E. Hiller, Ü. Aydemir, W. Enne, H. Dietzfelbinger, et al., Second malignancies after Hodgkin's disease: the Munich experience, Ann. Hematol. 78 (1999) 544–554, https://doi.org/10.1007/s002770050556.

[5] M.E. Kalender, A. Sevinc, E. Tutar, C. Camcı, Senkron renal hucreli karsinom ve meme meduller karsinom birlikteliği, UHOD 2 (2005) 90–93.

[6] U.A. Kurlekar, A.S. Rayate, Synchronous primary malignancies in breast and kidney: a rare case report, Indian J. Surg. 77 (2015) 6–9, https://doi.org/10.1007/s12262-013-1031-0.

[7] S. Chakraborty, S.R. Tarantolo, S.K. Batra, R.J. Hauke, Incidence and prognostic significance of second primary cancers in renal cell carcinoma, Am. J. Clin. Oncol. 36 (2013) 132–142, https://doi.org/10.1097/coc.0b013e3182438ddf.

[8] U. Takalkar, B.N. Asegaonkar, P. Kodlikeri, An elderly woman with triple primary metachronous malignancy: a case report and review of the literature, Int. J. Surg. Case Rep. 4 (2013) 593–596, https://doi.org/10.1016/j.ijscr.2013.03.032.

[9] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, SCARE Group, The SCARE 2020 guideline: updating consensus Surgical CAse REport (SCARE) guidelines, Int. J. Surg. 84 (2020 Dec) 226–230, https://doi.org/10.1016/j.ijsu.2020.10.034.

[10] T. Billroth, G. Reimer, in: Die allgemeine chirurgische pathologie und therapie. 51 Vorlesungen-Ein Handbuch fur Studierende und Artze, 14 Auflage, Berlin, 1889, p. 908.

[11] S. Warren, O. Gates, Multiple primary malignant tumors: a survey of the literature and a statistical study, Am. J. Cancer 16 (1932) 1358–1414.

[12] J.L. Gluckman, J.D. Crissman, J.O. Donegan, Multicentric squamous-cell carcinoma of the upper aerodigestive tract, Head Neck Surg. 3 (1980) 90–96, https://doi.org/10.1002/hed.2890030203.

[13] C.G. Moertel, Multiple primary malignant neoplasms: historical perspectives, Cancer 40 (4 Suppl) (1977) 1786–1792, https://doi.org/10.1002/1097-0142(197710)40:4+%3C1786::aid-cncr2820400803%3E3.0.co;2-2.

[14] S.I. Hajdu, E.O. Hajdu, Multiple primary malignant tumors, J. Am. Geriatr. Soc. 16 (1968) 16–26, https://doi.org/10.1111/j.1532-5415.1968.tb03965.x.

[15] T. Berge, L. Cederqvist, J. Schonebeck, Multiple primary malignant tumours. An autopsy study of a circumscribed population, Acta Pathol. Microbiol. Scand. 76 (1969) 171–183. PMID: 5373627.

[16] A.J. Haddow, J.F. Boyd, Multiple primary neoplasms in the Western Hospital Region, Scotland: a survey based on cancer registration data, Scott. Med. J. 17 (1972) 143–152, https://doi.org/10.1177/003693307201700404.

[17] S. Kaneko, N. Yamaguchi, Epidemiological analysis of site relationships of synchronous and metachronous multiple primary cancers in the National Cancer Center, Japan, 1962–1996, Jpn. J. Clin. Oncol. 29 (1999) 96–105, https://doi.org/10.1093/jjco/29.2.96.

[18] K. Kagei, M. Hosokawa, H. Shirato, et al., Efficacy of intense screening and treatment for synchronous second primary cancers in patients with esophageal cancer, Jpn. J. Clin. Oncol. 32 (2002) 120–127, https://doi.org/10.1093/jjco/hyf028.

[19] M. Sarma, C. Borde, P. Subramanyam, et al., Random synchronous malignancy in male breast: a case report, J.Breast Cancer 16 (2013) 442–446, https://doi.org/10.4048/jbc.2013.16.4.442.

[20] F. Jiao, L.J. Yao, J. Zhou, et al., Clinical features of multiple primary malignancies: a retrospective analysis of 72 Chinese patients, Asian Pac. J. Cancer Prev. 15 (2014) 331–334, https://doi.org/10.7314/APJCP.2014.15.1.331.
[21] A. Elgazar, A. Awad, D. Mnadal, M. Elbadawy, S. Elseidy, Synchronous breast invasive ductal carcinoma and clear cell renal carcinoma: case report and a review of literature, J. Surg. Case Rep. 2021 (7) (July 2021), rjab317, https://doi.org/10.1093/jscr/rjab317.
[22] Z. Huo, Y. Gao, Z. Yu, W. Zuo, Y. Zhang, Metastasis of breast cancer to renal cancer: report of a rare case, Int. J. Clin. Exp. Pathol. 8 (11) (2015) 15417. PMID: 26823905.
[23] T.D. Chen, L.Y. Lee, A case of renal cell carcinoma metastasizing to invasive ductal breast carcinoma, J. Formos. Med. Assoc. 113 (2) (2014 Feb) 133–136, https://doi.org/10.1016/j.jfma.2012.07.022.
[24] K. Hemminki, P. Boffetta, Multiple primary cancers as clues to environmental and heritable causes of cancer and mechanisms of carcinogenesis, IARC Sci. Publ. 157 (2004) 289–297. PMID: 15055302.
[25] B.C. Lee, C.S. Yu, J. Kim, J.L. Lee, C.W. Kim, Y.S. Yoon, I.J. Park, S.B. Lim, J.C. Kim, Clinicopathological features and surgical options for synchronous colorectal cancer, Medicine (Baltimore) 96 (9) (2017 Mar), e6224, https://doi.org/10.1097/md.0000000000006224.
[26] K.H. Tsui, O. Shvarts, R.B. Smith, et al., Prognostic indicators for renal cell carcinoma: a multivariate analysis of 643 patients using the revised 1997 TNM staging criteria, J. Urol. 163 (1090–1095) (2000), https://doi.org/10.1016/s0022-5347(05)67699-9 quiz 1295.
[27] A. Elias, Male breast cancer - case report and brief review, Middle East J. Fam.Med. 6 (6) (2004) 1–6.
[28] G. Mesa, G. Matute, M. Estrada, A. Ocampo, C. Restrepo, J. Estrada, Cáncer mamarioen hombres, Rev. Colomb. Cir. 26 (2011) 293–307.
[29] M. Bravo, A. Adrada, H. Bolaños, Cáncer mamario en el hombre. Presentación de un caso y revisión de la literatura, Rev. Colomb. Cir. 19 (4) (2004) 246–253.