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CASE REPORT

Triple Synchronous Primary Tumors of Stomach, Kidney and Ovary: A Rare Case Report

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Abstract

Synchronous multiple primary malignancies are rare clinical condition, and the occurrence of triple synchronous primary tumors are exceptionally uncommon. Among these, the simultaneous occurrence of primary gastric, renal, and ovarian tumor has seldom been reported in the literature. We present a case of a 70 year- female who presented with abdominal pain and endoscopic biopsy showed gastric adenocarcinoma. CECT abdomen and pelvis subsequently revealed an incidental right renal and ovarian tumor. The patient underwent curative surgical resection for all three tumors in a single operative session. Post-surgical histopathology confirmed Clear cell renal cell carcinoma and Ovarian mature cystic teratoma. There was no evidence of metastasis among the tumors. Elderly patient with gastric carcinoma have a higher risk of developing a synchronous tumor than younger people. This case highlights the importance of thorough diagnostic evaluation of multiple primary malignancies in an elderly patients with gastric cancer , as the differentiation between metastatsis and synchronous primaries significantly influences the planning of treatment. Early detection and multidisciplinary approach are essential for optimizing outcomes in such rare and complex presentations.

Keywords: Synchronous tumors- gastric carcinoma- renal carcinoma- ovarian teratoma

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Introduction

Multiple primary malignancies (MPM) has been rising in recent years, largely attributable to the widespread implementation of regular cancer screening and advancements in diagnostic modalities. Warren and Gates first defined MPM as the occurrence of two or more histopathologically distinct malignancies in the same individual, explicitly excluding metastatic disease [1]. Synchronous tumors refer to cases in which a second primary tumor is diagnosed within six months of first neoplasm1. Most cases of multiple primary malignancies involve two primary tumors, while triple synchronous malignancies remain exceedingly rare. Gastric carcinoma ranks as the fifth most commonly diagnosed cancer worldwide, with millions of new cases reported annually [2]. The incidence of synchronous primary tumors alongside gastric carcinoma varies between 0.7% and 11% [3], with the most common synchronous sites being the colorectal, lungs, and liver [4]. However, the synchronous presentation of gastric carcinoma and renal cell carcinoma is exceptionally rare, with reported prevalence ranging from 0.11% to 0.37% [5]. Herein, we present an intriguing case of an elderly female patient diagnosed with three synchronous primary tumors involving the stomach, kidney, and ovary.

Case presentation

A 70 year old female came with complaints of abdominal pain, loss of weight and appetite for 6 months and vomiting for 10 days. Notably patient had no significant family history .

An initial upper gastrointestinal endoscopy revealed a growth in the pylorus of stomach and biopsy from the growth sent for histopathological examination, which confirmed a diagnosis of Intestinal-type adenocarcinoma of the stomach.

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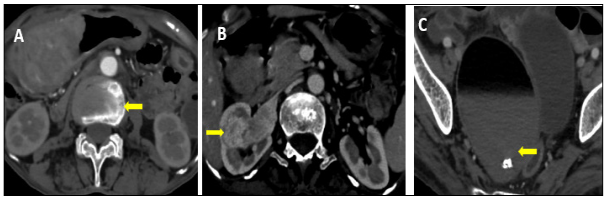

Figure 1. CECT Abdomen and Pelvis of a 70-year-old female Showing: A-Growth in the stomach with heterogeneous enhancement.B-Intensely enhancing exophytic right renal mass. C-Right ovarian dermoid cyst with peripheral calcification.

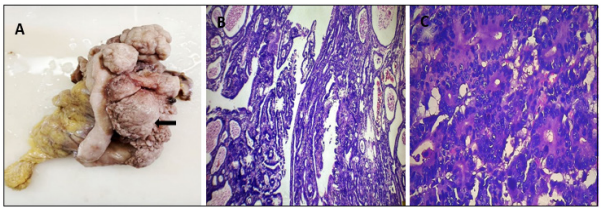

Figure 2. A- Gross Picture Showing Distal Gastrectomy Specimen with Multiple Polypoidal, Growth Arising from Lesser Curvature. B- Microscopy, showing tumor cells arranged in glandular pattern of varying size and shape with focal area showing cribriform structures. (H and E stain -4X) C- Tumor cells exhibiting moderate pleomorphism with scant cytoplasm, high NC ratio, hyperchromatic to vesicular nuclei.(H and E stain -10X)

Subsequent contrast-enhanced computed tomography (CECT) of the abdomen and pelvis revealed circumferential, asymmetrical polypoidal growth along the greater curvature involving antrum and pylorus of stomach (Figure 1A). In addition, CECT identified a well-defined isodense mass in the upper pole of the right kidney, with no evidence of renal vein or arterial invasion (Figure 1B). A heterogeneous lesion was also noted in the right adnexal region, containing fat-fluid levels and calcific foci (Figure 1C).

The patient underwent concomitant surgical procedure consisting of distal gastrectomy, right radical nephrectomy and total abdominal hysterectomy with bilateral salpingo-oophorectomy along with station VII (Nodes along left gastric artery), station XII (Nodes in the hepatoduodenal ligament) and para-aortic lymph node dissection.

Grossly, distal gastrectomy specimen showed multiple polypoidal growth measuring 13x8x7 cm arising from lesser curvature and extending upto greater curvature (Figure 2A). Microscopic examination showed features consistent with Gastric Adenocarcinoma, Intestinal type, moderately differentiated (Figure 2B,2C). According to the TNM classification, the tumor was staged as pT4aN1.

Right Radical nephrectomy specimen revealed a single circumscribed grey white, firm tumor measuring 2.5x2x1.9cm located in the upper pole of the kidney near the renal sinus (Figure 3A). Histopathological analysis demonstrated a tumor composed of cells arranged in sheets, cords, and nests (Figure 3B). The tumor cells exhibited clear cytoplasm and distinct cell borders, consistent with Clear cell renal cell carcinoma, ISUP Grade 3, and staged as pT1aN0 (Figure 3C).

Right ovarian cystectomy specimen measuring 10.5x8x6 cm showed a uniloculated cyst filled with pultaceous material with attached hair follicle and focal grey white to grey yellow thickened area measuring 2.5x0.8cm. (Figure 4A). Microscopy showed a fibrocollagenous cyst wall partly lined by pseudostratified ciliated columnar epithelium and partly lined by stratified squamous epithelium. The subepithelium showed pilosebaceous unit with apocrine glands, bony fragment, mature cartilage, adipose tissue, and neural tissue with focal calcification suggesting Ovarian Mature cystic teratoma (Figure 4B, 4C).

The patient gave written informed consent to publish her case and the images.

Discussion

Multiple primary malignancies (MPM) refers to the occurrence of more than one primary malignancy arising independently at different anatomical sites in the same individual [6]. According to the diagnostic criteria proposed by Warren and Gates, each malignancy must originate in a different site or organ with unique pathological features, explicitly excluding cases of metastasis or tumor recurrence [6]. The reported prevalence of MPM ranging from 0.734% to 11.4% in a review of 1,104,269 patients, with synchronous tumors type having a much lower proportion [7].

Several risk factors contribute to the development of MPM, includes immunological defects, inherited genetic syndromes like Li-Fraumeni syndrome, environmental exposure to carcinogens such as tobacco smoking, and previous chemotherapy [8].

Gastric carcinoma ranks as the fifth most commonly diagnosed cancer worldwide. However, the synchronous occurrence of gastric and renal malignancies is uncommon, with reported prevalence rates from 0.11% to 0.37% [3], and a male-to-female ratio is 2:1 [4, 9]. Established risk factors for synchronous gastric and renal cancers include advanced age, male sex, and chronic smoking , although no specific genetic mutations have been identified to explain their simultaneous manifestation [10].

Clinically, patients with synchronous gastric and renal tumors often present with gastrointestinal symptoms like bleeding, abdominal pain, and weight loss, without urinary tract symptoms [10]. In our case, the patient presented

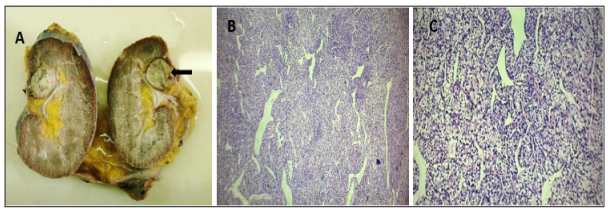

Figure 3. A- Gross Picture of Right Radical Nephrectomy Specimen, on Cut Surface Shows Single Well circumscribed Tumor in the Upper Pole of Kidney Near renal Sinus. B- Microscopy shows Tumor cells arranged in sheets, cords and nests.(H and E stain -4X) C-Tumor cells with distinct cell membrane and clear cytoplasm. (H and E stain-10X)

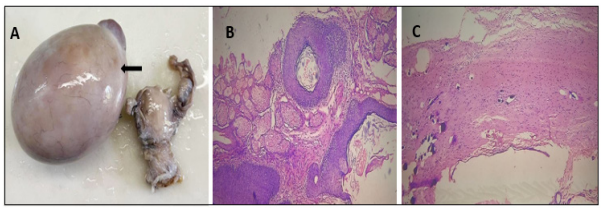

Figure 4. A- Gross Picture of Right Ovarian Cystectomy Specimen with Uterus and Cervix, Bilateral Fallopian Tubes and Left Ovary. External surface of right ovary is enlarged, smooth, glistening with intact capsule. B- Microscopy shows cyst wall lined by stratified squamous epithelium with pilosebaceous unit and apocrine glands. (H and E stain-10X) C-Microscopy shows mature neural tissue with focal calcification. (H and E stain-10X)

with abdominal pain and vomiting. Histopathologically, Poorly differentiated adenocarcinoma is the most commonly reported type in gastric carcinoma,but our patient exhibited a Moderately differentiated subtype [4]. Clear cell renal cell carcinoma is the predominant subtype observed which is consistent with our findings. Various studies in the literature found that renal tumors are frequently discovered incidentally on imaging techniques, as was the case here.

Uniquely, this patient also presented with a right ovarian cyst, histopathologically diagnosed as Ovarian mature cystic teratoma. The concurrent presence of three distinct tumors -Gastric adenocarcinoma, Clear cell renal cell carcinoma, and Ovarian mature cystic teratoma in a single patient underscores the rarity and clinical complexity of this presentation.

Effective management of these synchronous multiple primary cancers depends on comprehensive preoperative radiological staging of each tumor which guides the treatment strategy [11]. Curative surgical resection of all identified tumors remains the preferred treatment followed by adjuvant chemotherapy. Nevertheless, given the predilection of these malignancies in elderly patients, it is imperative to weigh the benefits of radical surgery against potential impacts on postoperative quality of life [12- 15].

The Pathologic stage of each tumor, its histologic differentiation and grade independently influence the patient's overall prognosis [16]. Though managing multiple primary malignancies is complex, early detection, accurate diagnosis and individualized multidisciplinary treatment planning can enhance long-term survival outcomes in selected cases [17]. In this case, the patient underwent successful concomitant distal gastrectomy, right radical nephrectomy, and ovarian cystectomy, exemplifying the feasibility of simultaneous curative surgery for synchronous tumors [14].

In conclusion, to conclude, we present a unique case involving synchronous primary malignancies of the stomach and kidney in a elderly female patient. What makes this case particularly distinctive are two factors: the patient's female gender, which is less commonly associated with such malignancies, and the presence of a third, concurrent tumor - an ovarian mature cystic teratoma. This case underscores the need to maintain a high index of suspicion for multiple primary cancers, especially in elderly individuals. Early detection of these incidental tumors by advanced imaging and multidisciplinary approach are essential for optimizing outcomes in such rare and complex presentations.

Acknowledgments

Statement of Transparency and Principals:

- Author declares no conflict of interest
- Study was approved by Research Ethic Committee of author affiliated Institute.
- Study's data is available upon a reasonable request.
- All authors have contributed to implementation of this research.

Originality Declaration for Figures

All figures included in this manuscript are original and have been created by the authors specifically for the purposes of this study. No previously published or copyrighted images have been used. The authors confirm that all graphical elements, illustrations, and visual materials were generated from the data obtained in the course of this research or designed uniquely for this manuscript.

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