KRUKENBERG TUMOUR—REPORT OF 2 CASES

by

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Introduction

The association of gastrointestinal cancer and simultaneous ovarian cancer has been observed for many years. As early as 1846 a specimen of the combined carcinomas was placed in the Museum of the College of Surgeons in London (Jarcho, 1938). From 1855 to 1896 (Diddle, 1955; Welch, 1893) many authors reported on patients with simultaneous carcinoma of the stomach and ovaries and even suggested the direct implantation of carcinoma cells from the stomach on to the ovaries (Novak and Gray, 1938). However, Krukenberg (1896) discredited the most significant publications on this subject. He named the tumour as 'fibrosarcoma ovari mucocellulare carcinomatoides'. Subsequently the epithelial character and metastatic origin of this tumour was established, and the term 'Krukenberg tumour' is now generally accepted to indicate a secondary undifferentiated mucinous ovarian carcinoma that exhibits the distinctive histological features described by Krukenberg. However, much confusion centres around what types of tumours should be considered as a Krukenberg tumour, since they have been reported as primary tumours (Schiller and Kozoll, 1941; Woodruff and Novak, 1960) as well as metastatic tumours (Jackson and Babcock, 1930; Niles and Franco, 1955). The primary source of metastatic tumours has been found in the breast (Woodruff and Novak, 1960), in addition to gastrointestinal tract (Bennett and Douglas, 1931).

The term is used by some authors tc include all carcinomas metastatic to the ovary (Leffel *et al*, 1942; McDuff, 1950) and it has been recommended by others that the term be discontinued (Israel *et al*, 1965; Lowman and Kushlan, 1945). It has been suggested that all these types of tumours should be classified by their origin (Larson, 1938), or that there should be various types of Krukenberg tumours designated (Norris, 1954). Others feel that all colon and rectal carcinomas should be excluded from consideration (Wheelock and Putony, 1959). This tumour is reported with pregnancy (Tawa and Barker, 1964), associated with elevated estrogens (Trunen, 1955) and seen with masculinization (Fox and Stamm, 1965).

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Two cases of Krukenberg tumours are reported out of 320 ovarian tumours from the files of Department of Pathology, Medical College, Aurangabad.

Case Report

Case 1

T.L., 55 years old female was admitted to Medical College Hospital, Aurangabad, with the complaints of vaginal bleeding of 15 days duration and pain in the abdomen for the last 2 months. Her previous menstrual history was normal. She had 2 full term deliveries and 3 abortions. Last delivery about 22 years back. Menopause 10 years prior to admission.

On abdominal examination, there was a lump in the lower abdomen, firm in consistency. Vaginal examination revealed second degree prolapse of the uterus.

Laboratory and X ray examinations were normal. No evidence of gastrointestinal malignancy was found. She underwent a total abdominal hystrectomy and bilateral salphingo-oophorectomy. She was reported to be free of symptoms for a period of 3 months. Unfortunately she could not be followed-up.

Pathology

The gross specimen consisted of the uterus and both ovaries and fallopian tubes. Both ovaries were large lobulated and replaced by greyish-white homogenous masses. (Fig. 1).

Microscopic examination showed diffuse infiltration of the basic stroma with large cells, the nuclei of which were eccentrically placed producing the characteristic 'signet-ring' appearance (Fig. 2). A sarcomatous appearance was found in some areas of the lesion. In the stroma of the tumour matrix at few places theca-like type of cells were found. Sudan III staining showed sudanophilic material in the stromal cells. Histopathology of endometrium showed cystic hyperplasia (Fig. 3).

Case 2

A 38 years old female was admitted in the Medical College Hospital, Aurangabad, with the complaints of swelling and pain in the abdomen for the last 4 months. She was operated 3 years back for carcinoma stomach and gastrectomy was performed. Her previous menstrual history was normal. She had one full term delivery about 7 years back.

On abdominal examination a large mass was palpated in the lower abdomen. Shifting dullness was positive. Vaginal examination was normal. Haemogram showed microcytic hypochromic anaemia and raised E.S.R. The chest and bone survey X-rays showed no metastatic lesions. A bilateral salphingo-oophorectomy was performed. At laparotomy 1.5 litres of clear fluid was drained. The right ovary was large measuring 6″ x 4″ x 3″ in size, firm in consistency. She was reported to be alright after one year of operation.

Pathology

External surface was smooth and lobulated. Cut surface showed solid and a few cystic areas. Solid area was homogenous and showed areas of haemorrhages and necrosis. Left ovary was normal.

Microscopic examination revealed a complete replacement of ovarian structure by mucoid liquefaction with many typical signet ring cells'. There was persistence of adenocarcinomatous elements in part of the tomour (Fig. 4).

Discussion

The correct histogenesis and pathology of Krukenberg tumour was established by Schlagenhaufer in 1902. He recognised that these neoplasms were largely secondary to carcinoma elsewhere and were epithelial tumours characterised by the presence of signet cells in acini or as a diffuse infiltration in the stroma. He further established the mucocellular character of the neoplastic cells. It would seem important that if the term is to be maintained the tumours included under this name should fulfill the pathologic criteria suggested by Krukenberg even if the histogenesis has changed.

Whereas there seems little doubt that the majority of Krukenberg tumours are

secondary to malignancy elsewhere, usually in the gastrointestinal tract, there are several well authenticated cases of primary ovarian tumours (Frankel, 1920; Andrews, 1949; Schiller and Kozall, 1941; Woodruff and Novak, 1960) which fulfill the criteria for the diagnosis of this special neoplasm. Apart from stomach the large intestine is usually the second most common spot for the primary malignancy. However, occasional sites of origin for Krukenberg tumour of the ovary were recorded in the small intestines, appendix, gall bladder and breast (Leshick and Miller, 1926; Waugh and Findley, 1937; Woodruff and Novak, 1960; Woodruff *et al*, 1970).

Very few large series have been reported in the world literature. Karsh (1951) reported 72 cases in 10,287 autopsies, an incidence of 0.7 per cent. Woodruff and Novak (1960) reported 48 cases from the files of the ovarian tumour Registry, Baltimore, an incidence of 2.8 per cent. Hale (1968) reviews 81 Krukenberg tumours among the hospital records for a 20 years period in Honolulu where the incidence of carcinoma stomach is very high. Very few cases have been reported from India and no larger series has been reported. Konar (1967) reported a case of Krukenberg tumour removed with primary at the same operation. Tyagi *et al* (1967) reported only one case out of 120 ovarian tumours, an incidence of 0.85 per cent. Jagadeeswari (1971) reported 5 cases out of 95 total malignant ovarian tumours, an incidence of 5.2 per cent. Ramchandran *et al*, (1972) reported only one case out of 903 ovarian neoplasms. The total malignant tumours reported were 281 and the reported incidence amongst malignant tumours was 0.11 per cent. In the present study two cases are reported out of 320 ovarian neoplasms. The total malignant tumours were 96, an incidence of 0.6 per cent amongst all ovarian tumours and 1.9 per cent amongst malignant tumours is similar to other reported series (Tyagi *et al*, 1967; Ramchandran *et al*, 1972) from India.

Ascitis was present in one of the two cases and its presence indicates bad prognosis (Woodruff and Novak, 1960). Ascitis was recorded as being present in 22 of the 48 cases of Woodruff and Novak (1960). A theca-lutein reaction has been reported as the common morphologic denominator in certain ovarian tumours which, though not usually associated with hormonal activity, may on occasion be associated with clinical and morphologic evidence of endocrine secretion (Ober *et al*, 1962). The present study reports one case out of the two cases, which exhibited a theca-lutein reaction in the ovarian stroma. Examination of the endometrium from same patient showed cystic hyperplasia. This patient was admitted with the complaints of vaginal bleeding in postmenopausal age. Perhaps the bleeding was due to the endocrine activity as a result of theca-lutein reaction in the ovarian stroma of the tumour. Sudan III staining of the same tissue showed sudanophilic material in some of the stromal cells. In Trunen's series (1955), the 8 patients who had associated endometrial hyperplasia also had plump theca-like cells in the stroma of the metastatic ovarian tumours which were rich in sudanophilic material. Scully and Richardson (1961) found that in 53 cases of metastatic tumours of the ovary there was a theca-lutein reaction in 16 of 31 cases, primary in the large intestine, but there was no such reaction in 16 cases with a gastric primary tumour or in 6 cases of diverse primary origin. Three of the 16 patients who had metastatic car-

cinoma of the colon and a theca-lutein reaction also exhibited endometrial hyperplasia.

We concur with Morris and Scully (1958) and Ober *et al* (1962), that in certain ovarian tumours stroma may, on occasion, metamorphose to cells capable of steroid production. The demonstration of sudanophilia in the stromal cells of these tumours does not furnish evidence as to the nature of the steroids, it is chiefly the neutral fat which is stained. However, it does support in general the idea that this stroma is the site of considerable lipid metabolism which, by virtue of its location, is presumably steroid.

Summary

Two cases of Krukenberg tumours are reported, from the files of the Department of Pathology, Medical College, Aurangabad, during the last 8 years giving an incidence of 0.6 per cent amongst all ovarian tumours and 1.9 per cent amongst total malignant tumours. One of the two cases showed theca-lutein reaction and endometrial cystic hyperplasia in a post menopausal woman and in the other case no primary malignancy was found.

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See Figs. on Art paper V