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Gonadoblastoma with Distinctly Unusual Pattern of Yolk Sac Tumour Overgrowth

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A 16-year-old girl with primary amenorrhoea presented with a two month history of a lump and discomfort in lower abdomen. She had lack of breast development, clitoromegaly and a pelvic mass. Ultrasonography revealed a heterogenous pelvic mass with calcific foci. CT scan showed a 13 x 10 x 9.5 cm mixed density pelvic mass. Karyotypic studies demonstrated 46-XY pattern. Exploratory laparotomy revealed a hypoplastic uterus, a large left ovarian mass with an intact capsule and a right streak ovary. There were no peritoneal deposits and the liver and lymph nodes were not involved. Both ovaries were removed.

The left ovarian mass weighed 600gm with a predominantly solid cut surface that showed numerous, variable sized cysts, some with mucoid contents (Figure 1). Focally, gritty calcific foci were felt. Microscopy revealed a mixed germ cell neoplasm comprising yolk sac tumour and dysgerminoma. Yolk sac tumour constituted about 80 per cent of the neoplasm and showed the characteristic vascularised, myxoid stroma with spindle cells amidst which were glands lined by epithelial cells with subnuclear vacuoles. Some areas had myxoid lobules separated by multiple blood filled sinusoidal spaces (Figure 2). Also present were cysts lined by mucinous epithelium with goblet cells and others had multilayered lining reminiscent of squamous epithelium (Figure 3). Hyaline globules were absent; however, immunohistochemical staining for AFP was positive in such glandular and cystic areas. The dysgerminoma component was seen as sheets of clear cells with intersecting fibrous septae containing lymphocytes. Focal calcifications in the vicinity of dysgerminoma were evidence of burnt out gonadoblastoma. Extensive sampling of the tumour failed to yield any other elements and neuroepithelial differentiation was absent.

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Prior Presentation as poster at the Annual Conference of the Indian Association of Pathologists, Kanyakumari, December 1998.
The right ovary was a 2x0.3cm streak structure. Microscopy revealed pure gonadoblastoma seen as nests of germ cells and sex cord cells amidst frequent coarse calcific foci. Ovarian follicles were absent and the stroma was fibrous.

Following this pathologic examination, measurement of serum alpha fetoprotein (AFP) level was recommended and the value was 1500ng/ml on the third post-operative day. Chemotherapy was commenced and patient was free of the tumour six months later. Further follow up is not available.

Discussion
Gonadoblastomas are an unusual mixed germ cell sex cord neoplasms occurring in dysgenetic streak ovaries that are generally incapable of female sex hormone production but may produce androgenic hormones.1

Pure gonadoblastomas are usually less than 3 cm in size, frequently bilateral, the underlying gonad being a fibrous streak or rarely showing testis or ovotestis.1 Germ and sex cord cell nests are usually obliterated by heavy calcification, a change referred to as burnt out gonadoblastoma.1 Overgrowth of germ cell component occurs in 60% cases, may also be bilateral and usually results in dysgerminoma.1,2 Calcific foci amidst dysgerminoma are an important clue to underlying burnt out gonadoblastoma.1 Overgrowth by other germ cell elements such as yolk sac tumour, immature teratoma, choriocarcinoma and mixed germ cell neoplasms occurs in less than 10% cases.1,3

In this case, glands and epithelial lined cysts were unusual, specialised patterns of yolk sac tumour.4 They demonstrated AFP positivity and had vascularised, myxoid stroma both of which are important features of yolk sac tumour.4,5 Specialised patterns represent somatic differentiation of the endodermal lining of the yolk sac.4,6 Thus, glands with subnuclear vacuoles represent endometrial differentiation while epithelium with goblet cells represents intestinal differentiation.6,7 Cysts with squamoid lining resemble the squamous tubules of the early oesophagus.5,6 The extra-embryonic mesenchyme that surrounds the yolk sac forms the characteristic myxoid stroma, and may appear as myxoid lobules.4 The stromal cells are pluripotent and can form a variety of tissues.5 Thus yolk sac tumours are in fact teratoid neoplasms.4,5

Histologically, teratoid yolk sac tumours mimic immature teratomas especially if conventional yolk sac pattern is absent.4,5 Yolk sac tumour has an aggressive behaviour and hence correct recognition and quantitation of amount of yolk sac tumour component is important.4 Immature teratomas characteristically show neuroepithelial differentiation.4 AFP, an endodermal derivative, is a valuable marker for yolk sac tumour; however levels may also be elevated in immature endodermal teratomas but are seldom over 1000ng/ml.5 Pure endodermal immature teratomas lacking neuroepithelial differentiation should in fact be classified as yolk sac tumours.4

Pure gonadoblastomas are in situ germ cell malignancies and warrant prophylactic gonadectomy.1 Dysgerminoma overgrowth, not extending beyond the capsule has good prognosis.1 Yolk sac tumour overgrowth has less favourable prognosis4 and requires multi-agent chemotherapy.

References