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Management of ovarian disease in pregnancy

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The ovary is a complex structure that is responsible for maintaining the endocrine support for a pregnancy during the first trimester until the placenta is sufficiently developed to assume this role. Most ovarian disorders of pregnancy actually relate to pre-existing ovarian conditions such as polycystic ovary syndrome and premature ovarian insufficiency. Both of these are associated with increased complications in pregnancy and require careful monitoring. Ovarian disorders that are a particular consequence of the hormonal milieu of pregnancy such as pregnancy luteoma (PL) and hyperreactio luteinalis (HL) are rare. However, they have important implications for both the mother and the foetus since they can be confused with ovarian malignancy leading to unnecessary surgery. This review focuses on the salient aspects of management of these ovarian conditions during pregnancy.

Structure of the ovary

The ovary consists of three main cell types: theca cells, granulosa cells, germ cells as well as support structures. The ovarian cortex is made up of ovarian follicles surrounded by stroma. The ovarian follicles in turn consist of granulosa cells and cumulus oophorus which surround the primary oocyte. Ovarian follicles are more plentiful beneath the capsule of the ovary and become increasingly sparse towards the ovarian medulla. Each follicle is surrounded by theca cells that are the source of androgens which in turn are the substrate for follicular oestrogen production mediated by aromatisation within the granulosa cells.

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Review of ovarian function in pregnancy

The main role of the ovary during pregnancy is to supply endocrine support over the first trimester until the placenta becomes self-sufficient. This function is mediated by the corpus luteum.

Corpus luteum

The corpus luteum is essential for establishing and maintaining pregnancy through the secretion of progesterone which is responsible for decidualization of the endometrium under the influence of luteinising hormone and subsequently chorionic gonadotrophin from the trophoblast.

This temporary endocrine gland also makes significant quantities of androgen and oestradiol. Approximately one-third of the cells of the corpus luteum are steroidogenic and secreting 17 hydroxyprogesterone, androstenedione and oestradiol in addition to progesterone. These cells are derived from theca interna and granulosa lutein cells. Endothelial cells make up another third of the cells within the corpus luteum and these are derived from intense vascular proliferation which results in a rich capillary network under the influence of vascular endothelial growth factor. Further cell types include immune cells, macrophages and fibroblasts. In a fertile cycle the corpus luteum is rescued from regression by the action of hCG secreted by the trophoblast. Serum hCG is detectable from approximately 8 days after ovulation rising progressively over the first 12 weeks of pregnancy.

The corpus luteum also produces the peptide hormone relaxin from the time of ovulation through the first trimester of pregnancy. The degree of dependency of the human pregnancy on this hormone is uncertain. For instance, women who achieve pregnancy without a corpus luteum using ovum donation have low circulating relaxin concentrations with no obvious adverse effects. In women, laxity of the joints of the pelvis results in separation of the symphisis pubis by up to 10 mm and this process has been attributed to the action of relaxin; an action inferred from the role of relaxin in rodents. Raised serum relaxin concentrations are found in pregnant women with type 1 diabetes mellitus but this may be accounted for by cross-reacting proteins.[1]

Pre-existing ovarian pathology and pregnancy

Polycystic ovary syndrome (PCOS)

There is a great deal of information alluding to the possibility that women who have PCOS appear to have an increased risk of miscarriage, pregnancy-induced hypertension, gestational diabetes (GDM), and premature delivery.[2] For the most part, these risks are related to obesity rather than PCOS per se and there is no good data that identifies an increased risk of any event related to pregnancy once overweight has been controlled for.

There is no doubt however, that the genetic and environmental background of women with PCOS leads to an increased risk of gestational diabetes.[3] A background of PCOS therefore should trigger more stringent surveillance for GDM in pregnancy and early advice on lifestyle changes as a preventative measure. Management of hypertension and GDM in the context of PCOS should follow conventional guidelines. Some retrospective studies have investigated the possibility that the administration of metformin in pregnancy may reduce the prevalence of GDM or miscarriage[4] but there is no good quality evidence to support this notion. Lifestyle measures remain the mainstay of reducing the risk of GDM in women with PCOS. While pre-treatment with metformin has been shown to result in a slightly higher pregnancy rate in women with PCOS compared to controls, using the more stringent end point of live birth rate, there is no evidence of a beneficial effect from this drug.[5] In the context of In vitro fertilisation (IVF) however, the use of metformin into early pregnancy appears to reduce the incidence of ovarian hyperstimulation syndrome (OHSS).[6]

Premature ovarian insufficiency (POI)

The number of women with POI who take up the option of pregnancy with ovum donation is increasing.[7,8] All pregnancies from assisted reproductive technologies carry a higher risk of adverse