Breast diseases during pregnancy and lactation

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Breast is a typical female sexual physiologic organ that is influenced by steroid hormone from menarche until menopause. Therefore various diseases can be developed by continuous action of estrogen and progesterone. Breast diseases are mainly categorized as benign and malignant. It is very important to distinguish the malignancy from breast diseases. However, it is very difficult to diagnose malignancy in pregnant and lactating women even though the same breast diseases took place. Therefore, we will review breast diseases such as breast carcinoma during pregnancy and lactation.

Keywords: Breast disease; Pregnancy; Lactation

Introduction

During pregnancy and lactation, a woman’s breasts face several physiological changes. These changes can be attributed to various hormones, which may also cause vascular hyperplasia and hyperplastic lobules [1]. Such changes may hinder the interpretation of physical and medical imaging examinations of the breasts. It is important to note that most breast lesions that are diagnosed during pregnancy and lactation are benign; however, the different diagnosis of breast cancer is challenging during these periods. Therefore, the aim of this article was to review the changes occurring in the breast, which are related to pregnancy and lactation, and to identify methods for the different diagnosis and treatment of breast disease.

Breast changes during pregnancy and lactation

Breast begins to change under the influence of estrogen, progesterone, and prolactin from the mid-term in the first trimester of pregnancy. Particularly, by the influence of estrogen the blood vessels show remarkable growth, and lobules are proliferated. For the meantime, fibrolipoma substrate decreases, blood flow increases, and infiltration of mononuclear cell are often accompanied. During the second and the third period of pregnancy, the proliferation of lobules and the decrease in the substrate become more apparent. Normally, due to progesterone, cell proliferation in the unit of lobule appears apparently, and due to estrogen, the ductal proliferation comes to be much intense. Under the influence of the hormones prolactin and oxytoxin (secreted by the posterior pituitary gland), during late pregnancy, the alveolar cells produce early breast milk called colostrum by taking up nutrients from the blood. Foremilk and hindmilk, whose compositions are different from that of colostrum, are subsequently produced with the help of the hormone progesterone (lactogenesis I). In a period of lactation, due to drastic reduction of progesterone, prolactin levels increase. Shape of myoepithelial cell becomes much thinner and flatter, and along with insulin, thyroid hormone and other metabolic hormones, the myoepithelial cell synthesizes the basic nutrients of breast milk-fat, lactose, and protein (lactogenesis II). During a period of lactation, breast displays
the lobular expansion as well as the accumulation of ductal secretion (Fig. 1). The breast milk is secreted by oxytocin and neuroendocrine interactions. To producing of breastfeeding constantly being generated during a period of lactation, a certain amount of oxytocin from the posterior pituitary needs to secrete by stimulating that comes from sucking (lactogenesis III) [2-6].

It takes three months after discontinuation of breast-feeding in order to pre-pregnancy state, and during this process pronounced atrophy of lobules is detected [3].

**Imaging and biopsy during pregnancy and lactation**

In this period, it is very difficult to distinguish between tumor and normal breast by clinical examination or imaging test. Since the breasts continue to grow and feel firm and nodular during pregnancy, it is possible that a tumor mass may appear as normal tissue during this period. Furthermore, as the breast increases its size, the tumor mass may be located deeper, making it more difficult to identify via palpation.

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**Fig. 1.** Changes of breast tissue during lactation. (A) Terminal duct-lobular unit in non-pregnancy (H&E, ×200). (B) Dilated lobular acini with vacuoles and secretions can be seen during lactation (H&E, ×200).

**Fig. 2.** Mammographic changes during lactation. (A) Type 2 American College of Radiology classification shows before pregnancy. (B) Mammogram during lactation shows a marked diffuse increase in density.