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REVIEW

Thyroid cancer and pregnancy – a short review

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ABSTRACT

Thyroid cancer in pregnancy has led to many debates regarding its proper management starting from investigations for early diagnosis, mode of management and follow up after pregnancy. Incidence of thyroid cancer has been increasing in recent years. Nodules detected during pregnancy require follow up with ultrasound and fine needle aspiration cytology. If malignancy is detected, surgery can be safely carried out in the second trimester of pregnancy. Thyroxine administration is recommended after surgery. Subsequent pregnancy should be delayed for atleast 12 months.

Keywords: Thyroid cancer, pregnancy, thyroidectomy.

Thyroid cancer has shown an upward curve in recent years. It is more common in women than men, and the proportion is found to increase during pregnancy. Thyroid cancer is the second most common malignancy (after breast cancer) during pregnancy [1]. It has been suggested that female hormonal and reproductive factors may play a role. Thyroid gland secretes higher amounts of hormone during pregnancy which has been implicated. Differentiated thyroid cancer (DTC) accounts for the majority of cases. There has been debate regarding timing of surgery, role of levothyroxine and appropriate follow up. The aim of this article is to review the published literature regarding the current knowledge in this field.

Epidemiology and risk factors -

Overall, ionising radiation remains the most important cause of thyroid cancer[2], but specifically in women other factors that are important include thyroid stimulating effects of human chorionic gonadotropin (HCG) and oestrogen[3]. Thyroid cancer incidence has been increasing worldwide [4,5]. Incidence of differentiated thyroid cancer increases sharply during puberty and decreases after menopause, which again suggests hormonal influence [6]. Some studies report early (<12 years) or late (>15 years) onset menarche to be associated with increased risk [7,8]. A twofold increase in risk of DTC has been reported following surgical menopause compared to premenopausal women[9]. Metastatic DTC is rare during pregnancy, with only 2-3% cases presenting with metastasis [10]. An association between recent pregnancy (within 5 years) and increased risk of thyroid cancer has been reported [11].

Changes during pregnancy -

Thyroid gland secretes higher quantity of hormone during pregnancy in response to human chorionic gonadotropin (HCG) which may override the normal hypothalamo-pituitary-thyroid feedback axis[12]. This has been linked with increased incidence of thyroid cancer during pregnancy. Along with an increase in maternal thyroid volume, there is increased urinary iodine excretion. Other changes include doubling of thyroxine binding globulin (TBG) and an increase in total thyroxine pool [13,14], mostly in the first trimester. TSH concentration decreases between 9th to 12th week and again returns to normal levels after 18th week [15]. Intestinal calcium absorption increases during pregnancy to provide additional calcium required for foetus[16]. In post thyroidectomy patients, these physiological changes of pregnancy will not be seen. As a result, post thyroidectomy patients will need calcium and vitamin D supplementation with regular monitoring.

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Diagnosis

Most thyroid nodules detected during pregnancy are believed to be benign or colloid nodules, but Doherty and Rosen [17, 18] have reported rates of upto 43% nodules discovered during pregnancy to be malignant. Upto10% of thyroid cancers occurring during the reproductive years are diagnosed during pregnancy or in the early post-partum period.

Physiological thyroid changes during pregnancy may be misinterpreted as malignancy. This can be avoided by routine clinical examination and ultrasound examination. Physical findings which may indicate malignancy include fixation of vocal cords, lymphadenopathy or fixity to skin. On ultrasound, high suspicion of malignancy is present with a solid hypoechoic nodule or a solid hypoechoic component in a partially cystic nodule with one or more of the following features: irregular margins, microcalcifications, taller than wide shape, disrupted rim calcifications with small extrusive hypoechoic soft tissue component, or evidence of extrathyroidal extension [19]. Ultrasound guided fine needle aspiration cytology (FNAC) is the investigation of choice [20]. Results are interpreted using Bethesda classification for cytological assessment [21]. Nodules with benign findings on fine needle aspiration cytology may be continued to be observed till the end of pregnancy. FNAC may be done on all thyroid nodules detected before 20 weeks gestation, while after 20 weeks, it can be considered for rapidly growing nodules [22].

Thyroid cancer during pregnancy has been reported to have faster growth due to impact of hormonal fluctuations of TSH, oestrogen and HCG[23]. However, overall disease morbidity does not alter much in comparison to other groups[24]. Routine measurement of serum thyroglobulin is not recommended. Timing of diagnosis during pregnancy does not affect the prognosis[25]. Differentiated thyroid carcinoma accounts for more than 90% of diagnosed thyroid carcinoma, with papillary carcinoma being the most common [26].

Management

The best treatment for thyroid malignancy remains surgery, with the goal of adequate excision of the primary tumour and local extensions, if any. Careful evaluation of nodes is to be done, with the help of pre operative ultrasound examination and intraoperative frozen section biopsy, if needed.

There has been debate regarding the timing of surgery. Thyroidectomy during pregnancy has been found to be safe when done with due precautions [27]. In many cases, surgery may be postponed till after delivery. However, surgery is to be done in the second trimester in cases with locally advanced histology, metastatic cervical lymph nodes or with severe compressive symptoms [28]. Surgery in the first trimester may cause teratogenic effect through action of general anaesthetic agents. Surgery in the third trimester may cause premature labour.

After thyroidectomy, thyroxine therapy is essential as even mild hypothyroidism may be harmful for the foetus[29]. Maternal hypothyroidism has been associated with decreased IQ in the child [29]. Thyroxine is administered in a manner which follows the physiological pattern, where there is increased demand at 4 to 6 weeks, increases till 16 to 20 weeks and then remains same till delivery [30]. After delivery, dose of thyroxine is reduced with regular monitoring of TSH level [31]. Radioactive iodine therapy can be administered only after the end of lactation period [32]. Pregnancy should be delayed for atleast 12 months after radioactive iodine therapy [33]. Use of radioactive iodine therapy has not been associated with adverse outcomes in subsequent pregnancies [34].

Conclusion

Thyroid cancer during pregnancy can be safely managed if there is proper coordination between the endocrine surgeon, physician and obstetrician. Although surgery can be safely done in the second trimester, it would be safest for the baby to wait till completion of pregnancy to carry out thyroidectomy, unless there is rapidly growing tumour in which case surgery cannot be delayed. With serial ultrasound and TSH monitoring most pregnancies can safely continue till term.

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