Case Report

Huge Obstructive Multinodular Goitre in a Pregnant Lady With Pre -Eclampsia: A Therapeutic Dilemma

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Abstract:

In pregnancy there are changes in regulation of thyroid hormone that can affect hypothalamic pituitary thyroid axis. This goitrogenic stimulation can lead to enlargement of thyroid gland. We present a case of 37-year-old woman gravida 4, para 3 at 27-week gestation, who was referred for management of a huge multinodular goitre with impending upper airway obstruction. Severe pre-eclampsia made airway narrower due to oedema at pharyngeal and glottic region. In case of no life-threatening airway, surgery can be electively performed after delivery as to avoid preterm labour. However, if emergency lower segment caesarean section is needed, preferably it to be done under regional anaesthesia in severe pre-eclampsia cases. If this fails, general anaesthesia may be required with awake fiberoptic, jet ventilation and bronchoscopy standby in case of difficult intubation due to constricted airway. Our patient underwent emergency lower segment caesarean section under spinal anaesthesia at 31 weeks gestation due to severe pre-eclampsia. Right hemithyroidectomy was done three months postnatal. Obstructive symptoms resolved after operation.

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Introduction

Multinodular goitre (MNG) is a benign enlargement of thyroid gland and more frequent in women.[1] It is a slow growing tumour and most patients remain asymptomatic until it exerts compression to the airway and oesophagus. Pregnancy is goitrogenic stimulus.[2,3] The thyroid hormones regulation is affected by physiology changes in pregnancy leads to increasing size of thyroid gland. This has led to the incidence of obstructive symptoms in pregnancy with MNG patients. When this situation develops, the management will be more challenging.

Case report

A 37-year-old lady in her gravida 4 para 3 at 27 weeks of gestation with an anterior neck swelling for ten years duration. For the past 10 years, the swelling has slowly increasing in size, however it has become rapidly increased in size since 20 weeks of gestation. She realized her voice has changed and there was some difficulty in breathing on exertion but there was no noisy breathing. Occasionally, she also experienced dysphagia. There were no symptoms of hyperthyroid or hypothyroid. On neck examination there was an anterior neck swelling, 30 cm x 14 cm in size. It was firm in consistency and the inferior border could not be palpated (Figure 1). Flexible nasopharyngolaryngoscopy was normal. Neck

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Figure 1: Huge multinodular goitre with normal overlying skin.

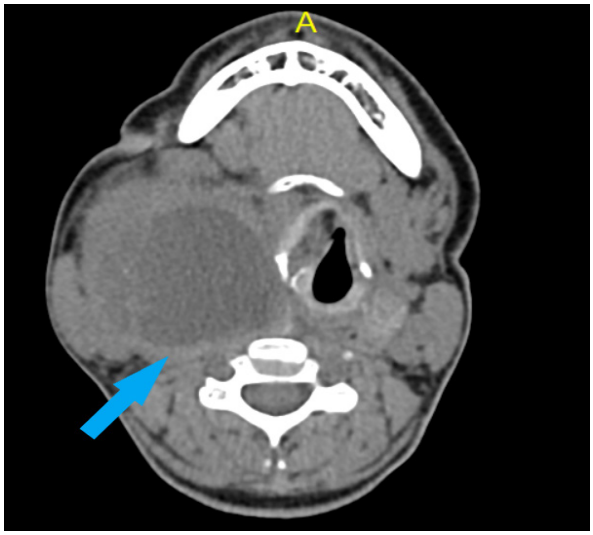

Figure 2: Right multinodular goitre (arrow) with airway compression on CT scan

radiograph showed a narrowed cervical trachea with evidence of compression by the thyroid mass. Chest radiograph showed retrosternal extension of thyroid mass. Ultrasonography (USG) neck reported as diffusely large thyroid gland with huge cystic nodules with presence of specks of calcification within. Fine needle aspiration cytology (FNAC) taken at central thyroid swelling and result showed nodular hyperplasia with cystic changes. Thyroid functions tests were normal. Patient developed pre-eclampsia at 26 weeks of gestation and was treated with tablet Labetolol 200 mg tds. She was admitted for blood pressure stabilization at 29 weeks of gestation. A multidisciplinary meeting was held involving otolaryngologist, head and neck surgeon, obstetrician, paediatrician and anaesthesiologist to discuss the issue surrounding the potential risk of worsening pre-eclampsia and sudden obstructive airway if pregnancy continues. Decision for most appropriate mode and timing of delivery were vital to ensure the best possible outcome for both mother and the baby. The plan was made for delivery at 32 weeks of gestation via LSCS with paediatric team standby. Two doses of steroid were given to reduce the risk respiratory distress syndrome (RDS) in view of preterm delivery. Early delivery will be required if worsening pre-eclampsia. Total thyroidectomy was planned three months postnatal. Unfortunately, she developed severe pre-eclampsia in the subsequent week and underwent emergency LSCS under spinal anaesthesia. She delivered a 1.08 kg healthy baby boy with good APGAR score. She was discharged well one week post-delivery. Computed tomography (CT) scan at one month later was consistent with MNG, predominantly of the right lobe with compressive effect to the airway without retrosternal extension (Figure 2).

Two months postnatal, the thyroid swelling reduces to 24 cm x 13 cm in size. The patient underwent surgery right hemithyroidectomy three months postnatal. Right hemithyroidectomy done in view of benign mass from FNAC result, CT scan evidence of normal left thyroid gland and intra operatively the left lobe was normal in size and on palpation. The surgery was uneventful. Obstructive symptoms completely resolved after operation.

Discussion

There is a higher prevalence of nodular goitre in women. Pregnancy itself may induce thyroid nodule enlargement.[1] There is also increased prevalence of thyroid nodule in women with higher gravidity. Thyroid gland significantly increases in size up to 30% from pre-pregnancy.[4] This was seen in chest radiograph and USG in our case in which the retrosternal extension was evident during pregnancy, however shrunk in size making it disappeared on CT post-delivery. Huge thyroid swelling can cause dysphagia and breathing difficulty secondary to local compression.[5] The enlargement of this gland could extend inferiorly into superior mediastinum, known as retrosternal thyroid. Patients may present with anterior neck mass with cardiac failure. Other symptoms include hoarseness of voice and stridor. This is due to the compression for a long course of the recurrent laryngeal nerve,

which runs in the medial surface of thyroid gland. There are two phases in MNG development. In the first phase, a goitrogenic stimulus leads to global thyroid proliferation and causing the overall increase in thyroid size. Second phase there is a focal increase in proliferation leading to nodule formation.[3] Goitre may increase in size abruptly in patients with pre-existing MNG during pregnancy leading to tracheal compression and respiratory compromise. There are multiple factors involved in thyroid hormone regulation in pregnancy. These changes lead to increase production of thyroid hormone by 50% above preconception period.[2] Human Chorionic Gonadotrophin (hCG) which have identical α subunit as TSH made hCG able to bind to the TSH receptor of thyroid follicular cells and directly stimulate thyroid gland to release T4 and T3.[6] HCG also plays a role in glandular enlargement.[7] High oestrogen level in pregnancy made rise of TBG, lead to decrease free thyroid hormone then stimulate pituitary to raise TSH level resulting in the increase of serum total T3 and T4. Increase deiodinases by placental deiodinases convert T4 to rT3 which causes increasing peripheral metabolism of thyroid hormone. Foetus received T3 and T4 from maternal via placenta. Plasma volume increases in pregnancy and so do T3 and T4 pool size. Pregnancy also causes increase of glomerular filtration rate leading to increase of urinary iodine excretion. Due to this negative iodine balance, thyroid hormone production increase to fulfil iodine requirement in pregnancy.[2,6] These stimulatory factors during pregnancy could lead to thyroid nodular formation. Some thyroid nodule became smaller in three months postpartum. This suggests that when stimuli is removed the nodule may resolve.[1] In our case the CT one month postnatal has no longer retrosternal component, and clinically the size reduced.

A goitre may cause tracheal compression affecting up to 75% of the tracheal lumen without causing any symptoms.[8] Not all patients with an enlarged thyroid gland develop compressive symptoms, despite the known anatomical relationship. MNG patients with thyroiditis have higher tendencies to be symptomatic.[9] Neck radiograph and flexible nasopharyngolaryngoscopy are necessary investigations. Airway patency is important in planning for surgery. CT scan helps to assess accurately the size of goitre, the possible extension to the mediastinum and mass effect to surrounding structure in neck and chest.[10] This is important when surgery is planned. Due to radiation risk during pregnancy, the CT scan was performed only after delivery.

The type of anaesthesia for thyroidectomy needs to be decided whether it is via intubation or regional block. In the case of a huge goitre with airway compromise the superficial cervical block is the better option. Superficial cervical block can provide complete sensory anaesthesia to C2-C4 dermatomes that innervate nerves from mandible to clavicle anteriorly and laterally.[11] If there is no airway compromise, elective thyroidectomy can be planned.

In pregnancy, besides managing obstructive symptoms of MNG, thyroid level needs to be optimized. The outcomes of maternal hypothyroidism include miscarriage, preterm delivery, pre-eclampsia, abruptio placenta and postpartum haemorrhage. Complications of baby of maternal hypothyroidism are increased foetal death rate, preterm birth, intrauterine growth retardation, low birth weight, increased neonatal respiratory distress and impaired neurointellectual child development. Pregnant patients with hyperthyroid are a risk of left ventricular dysfunction, thyroid storm, miscarriage, pre-eclampsia, preterm labour, still birth, gestational hypertension, placental abruption and postpartum haemorrhage. For foetuses and babies of maternal hyperthyroid could have fetal thyroid dysfunction, respiratory distress syndrome, congenital abnormalities, macrosomic baby or low birth weight.[2] We proceeded with FNAC in this patient due to the swelling which rapidly increasing in size and due to the presence of cystic features larger than four cm, which are the characteristic of malignancy in nature. The incidence of thyroid malignancy among the nodules diagnosed during pregnancy from FNAC is about 4.4%.[1] Cytology findings of our patient are nodular hyperplasia with cystic changes that is not suggestive of malignancy. Elective surgery during the third trimester is not recommended. This procedure may precipitate preterm labour.[12] There is a risk of narrowed airway due to compression the patient's trachea. Physiology changes in pregnancy cause generalized weight gain, increase of breast size, respiratory mucosal oedema and increase risk of pulmonary aspiration coupled with mass in the neck lead to more difficult and challenging in airway management.[6,13] They also found maternal

and foetal complications were 4.5% and 5.5% such as intra operative bleeding, wound infection and recurrent laryngeal nerve injury and foetal death.[13,14]

Our patient developed severe pre-eclampsia requiring emergency LSCS. The best option is spinal anaesthesia. There is more prominent pharyngeal and glottic oedema in pre-eclampsia which impose a higher risk of difficult intubation. There is also a risk of trauma during laryngoscopy which can obscure the airway and a significant increase in arterial blood pressure during laryngoscopy and intubation, which can lead to haemorrhagic stroke.[15] In our case, there is a presence of airway compression due to huge MNG and the swelling effect of severe pre-eclampsia that narrow the airway leading to difficult intubation. Awake fibre optic intubation with topical lidocaine anaesthesia is the choice of option if required. If fails, a jet ventilation is opted followed by rigid bronchoscopy to gain control of the airway.

Conclusion

Rapid enlargement of MNG is expected during pregnancy. Due to anatomical location and physiological changes during this period, it can cause upper airway obstruction. In severe pre-eclampsia, there may be a need for emergency delivery. Awake fibreoptic, jet ventilation and bronchoscopy need to be prepared in case of failing spinal anaesthesia. Thyroidectomy can be delayed until post-partum if there is no life-threatening airway compromise.

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