Surgical Management of Pituitary Adenoma During Pregnancy: A Short Series with Review of Literature

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Abstract

Background: Pituitary adenoma is infrequent during pregnancy. As surgery for pituitary adenoma is hazardous, further complicated by physiological changes brought by pregnancy. Mostly such cases were managed with medical therapy. As surgical adenoma decompression during pregnancy represent a therapeutic challenge for decompression without producing any further stress to pregnant women and teratogenic effect on foetus. So management during pregnancy is still debatable due to paucity of published literature. Aims: To analyze the outcome of surgery, who were operated during pregnancy for pituitary adenoma including effects of surgery and anaesthetic medications on developing foetus. Result: Authors are reporting two cases of pituitary adenoma, who presented during the pregnancy. First case presented during the third trimester and second in the second trimester of pregnancy with rapid deterioration of vision. Both patients underwent transsphenoidal decompression of pituitary adenoma. Pregnancy continued after surgery, and babies were delivered at term. During the follow-up period of the rest the pregnancy, growth of child was adequate without teratogenic effect. Conclusion: Our one case was operated safely through transsphenoidal approach during second trimester of pregnancy without any risk to fetus and another during third trimester. Uterine relaxant was continued in the postoperative period to prevent spontaneous abortion. Both cases were managed by trans-sphenoidal surgery. To the best of knowledge of authors, current report of two cases of pituitary adenoma associated with pregnancy is the first series of successful transsphenoidal decompression of pituitary adenoma during pregnancy. Pregnancy in both cases had good outcome. Patients with pituitary adenoma during pregnancy can safely undergo surgical intervention, if medication therapy is either ineffective in controlling symptoms, visual and neurological deficits or contraindicated.

Keywords
Pituitary Adenoma, Pregnancy, Management, Transsphenoidal Surgery

1. Introduction

Intracranial neoplasms presenting during pregnancy is uncommon and so paucity of literature. Only few isolated case reports are published in the western literature. Pituitary adenomas are generally considered as rare intracranial tumor, extremely uncommon during pregnancy. Pituitary adenoma of functional type may have variable effect on progression of pregnancy, miscarriages as well fetal development depending upon types of secreted hormones. Pituitary adenoma either associated with Cushing's disease or hyperthyroidism should be controlled to allow pregnancy to proceed without aggravating fetal and maternal morbidity, however, treatment of other type of adenoma during pregnancy for other tumors may not be essential. Surveillance for tumor growth during pregnancy is necessary primarily for prolactinomas. Molitch M E, in 2003 in detailed literature search to know the effects of pregnancy on pre-existing pituitary adenoma on pregnancy
outcome due to hormonal hyper secreting pituitary adenoma. [1] Authors observed Cushing’s disease as well as hyperprolactinemia may interfere with fertility. Further, acromegaly, hyperthyroidism, and Cushing’s syndrome may cause worsening of maternal and fetal morbidity and mortality. In contrast, non-functioning adenomas as well as growth hormone adenoma may not need medical therapy or surgical intervention during pregnancy. [1] An increase in the size of other types of tumors during pregnancy is very rare. However, those cases developing fresh visual deficit or neurological deficit may warrant surgical intervention to provide good visual outcome and fetal growth with continuation of pregnancy. As surgery of pituitary adenoma itself is major surgical procedure, further pregnancy produces additional change increases maternal and fetal risk to anaesthetic medication compounded by surgical procedure [1].

Authors are reporting two cases of pituitary adenoma, one presented in the second and another one in third trimester. Pituitary adenomas have been described to expand sharply during the pregnancy. Ohtsubo et al reported one case of pituitary adenoma, who noticed worsening of symptoms in the third trimester of pregnancy. [2] In addition to pregnancy induced aggravation of symptoms, the increased vascularity of these tumors, which in turn may initiate new or exacerbate pre-existing symptoms and causes mass effect to compress visual pathway, and few cases may became symptomatic during pregnancy. Further maternal systemic changes including circulatory changes, fluid retention, weight gain, changes in metabolism of anaesthetic medication together makes surgical procedure more challenging. Authors briefly discuss the management with review of pertinent literature.

2. Case Illustration: One

A 28-year old female presented to our neurological services during third trimester of pregnancy (gravida 1, para 0) with a history of progressive diminution of vision right eye for two months and fresh rapid visual deterioration involving left eye also for last 4 days. Her past history included primary infertility, her past investigation revealed high serum prolactin level and bromocriptine was started. She conceived while she was receiving bromocriptine, which was also continued during pregnancy. Her general examination was normal. Per abdominal examination showed a uterine size consistent with 32 weeks of gestation, normal heart rate. Neurologically she was conscious, and alert. Visual acuity on the left eye 6/36, while only perception of the light in the right eye. Fundi revealed bilateral primary optic atrophy. Other cranial nerves were normal. The rest of the neurological examination was essentially within normal limit. Biochemical and hematological parameters were normal. Endocrinology evaluation revealed serum cortisol — 4.5 p, g / dl (normal 5 -18), serum prolactin 1000 ng /ml (normal 1.3-24), with normal growth hormone and thyroid hormone level. Ultrasound revealed single viable foetus with fetal growth appropriate for an age. Magnetic resonance imaging revealed mass lesion in sella extending to suprasellar region showing homogeneous enhancement on contrast study (Fig-1) sagittal section image showing its extension up to the floor of third ventricle (Fig-2) and coronal contrast image showing large parasellar sub-temporal extension (Fig-3). On T2 weighted image, axial section brain showing hypointense signal of sellar mass compared to CSF and brain parenchyma with causing compression of optic chiasma from below (Fig- 4)
Fig. 3. MRI brain, contrast coronal section image showing enhancing giant sellar-suprasellar pituitary adenoma reaching up to floor of third ventricle. (Case-1).

Fig. 4. MRI brain T2WI axial section showing hypointense signal mass lesion in sella (Case-1).

She was taken up for surgery with consultation of obstetrician. Through endonasal trans-sphenoidal route decompression of pituitary adenoma was carried out. There was dark blood with greyish mass. The histopathology revealed chromophobe pituitary adenoma, which was positive for prolactin immunohistochemistry but negative for growth hormone. She made uneventful recovery of vision. A healthy female baby was born at the full term after surgery.

3. Illustrated Case - Two

A 27-year-old female in her second trimester of pregnancy (Gravida-2, para-1) presented with history of progressive diminution of vision right eye for 5 months and left eye for 3 months. She developed rapid loss of vision for last 5 days. Other significant past history included hypertension, which was controlled with oral antihypertensive medications. She consulted local obstetrician and advised magnetic resonance imaging, she was referred to our institute for further management. On admission, vitals were stable. Examination. Hormonal profiles showed serum prolactin 76 ng/ml (normal 1.3-24), while growth hormone, cortisol level, thyroid hormones were within normal limit. A magnetic resonance imaging demonstrated pituitary macroadenoma with suprasellar extension, and there was also extension of mass into lateral wall of cavernous sinus causing encasement of the left internal carotid artery. An abdominal ultrasound revealed a single viable foetus with growth corresponding to gestational age. Trans-sphenoidal decompression of pituitary adenoma was done at the 17 weeks of pregnancy. Postoperatively she made unremarkable recovery. Uterine relaxants were administered in preoperative period, was also continued for one week after surgery, further she advised regular follow-up with obstetrician. A histopathology examination of resected tissue revealed a pituitary adenoma. Immunoperoxidase stains were negative for growth hormone, prolactin and adrenocorticotrophic hormones. She delivered a healthy male baby at full term of pregnancy.

4. Discussion

Pituitary adenomas are rarely encountered, only few isolated case reports have been reported. [1-7] Very few isolated cases in form of cases-reports are published, describing surgical intervention during pregnancy. Pregnancy is very rare in patient harbouring pituitary adenoma. As pituitary adenoma is typically associated with either infertility or menstruations disorder causing very extremely rare occurrence of pregnancy because it is associated with reduced fertility [5], hyperprolactinemia [2, 4], disturbance of secretion of pituitary gonadotrophic hormones, or disturbances of pituitary hormones produced by hormonally active adenoma or by mass effect produced by non-functioning pituitary adenoma, or pituitary stalk effect or corticosteroid mediated suppression of gonadotrophin release [5, 8] These tumours can present for the first time during pregnancy or pre-existing symptoms may worsen during pregnancy. It represents a therapeutic challenge for surgical decompression without producing any further stress and problem for pregnant women and foetus. As surgery for decompression of pituitary adenoma should not produce any further stress to pregnant women and foetus. Our both cases having pituitary adenoma, presented during the pregnancy. Previously a conservative medical therapy was considered as suitable therapeutic modality. Berwaerts et al [4] in 1999 reported management of Cushing's syndrome in a 30-year-old lady, who refused surgical modality of therapy, was managed with oral Ketokonazole and cabergoline. Male child was delivered at full term. Ohtsubo et al [1] in 1991 after literature search could find only two cases of pituitary adenoma during pregnancy including their own case. However, isolated reports of trans-sphenoidal adenoma
decompression for Cushing syndrome was reported by Coyne et al [5], in a 22- year- old female, transsphenoidal surgery was done, when she was carrying a pregnancy of 14 weeks. Authors further reported this is second case report of successfully managed pregnancy in Cushing syndrome. Cheng et al [3] retrospectively analyzed 41 cases of pituitary adenoma in pregnancy their treatment before conception and relation to outcome. They reported incidence of pituitary adenoma in pregnancy was 1.02%.

In the current study, both cases presented with rapid deterioration of vision. An increase in size of pituitary adenoma during pregnancy has been reported for prolactinoma [10], growth hormone-secreting adenoma [11], and ACTH secreting adenoma [5] the leading hypotheses regarding mechanisms underlying increase in size of these tumors during pregnancy. One hypothesis of rapid expansion or engorgement of vascular bed, which is presumably the result of generalized increase in blood volume that occurs during pregnancy. The other hypotheses are direct influence of maternal hormonal effect on pituitary adenoma growth rate mediated by hormonal receptors. [5-13] Several metabolic and hemodynamic changes associated with pregnancy may affect, also may be responsible for enlargement and increased vascularity of pituitary adenoma. [14-18] Arterial hypertension or pre-eclampsia and tendency to retain extra cellular and intracellular fluid during pregnancy are considered to additional predisposing factors for development of increase in size of adenoma and associated increase intracranial pressure. These changes may accentuate the symptoms associated with adenoma during pregnancy. Such factor may even predispose to bleed inside pituitary adenoma. [8, 9] Authors feel that large size and increased vascularity of pituitary adenoma during pregnancy make them more vascular and growing size of adenoma may worsen the symptoms in a pre-existing tumor, this is well illustrated by our cases during surgery of pituitary adenoma. Both patients underwent trans-sphenoidal decompression of pituitary adenoma.

Surgery of pituitary adenoma is being safely performed during second week of pregnancy which precludes the risk of spontaneous abortion, who were newly diagnosed pituitary adenoma may be managed by close observation until the postpartum period, provided there are no impending neurological complication. Berwaerts et al [4] advocated conservatively management and managed surgically adenoma decompression can be done in the postpartum period, In a case reported by Coyne et al [5] transsphenoidal surgeries was carried out e at 14 of weeks pregnancy. Ross et al also reported a 24- year- female, was symptomatic since 16 weeks of gestation, although, surgery was only carried out at the 38 weeks of gestation.

5. Conclusion

Pituitary adenoma is rarely encountered during pregnancy. Their large size and increased vascularity during pregnancy exacerbate symptoms and signs. The symptomatic pituitary adenoma during pregnancy can be safely operated during second or third trimester of pregnancy, where conservative therapy is not effective or not advisable in view of neurological deficits.

References

[13] Satyarthee GD, Mahapatra AK. Pituitary apoplexy in a child presenting with massive subarachnoid and intraventricular


