Paraplegia in a puerperal woman due to spinal metastasis from papillary carcinoma of the thyroid gland

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ABSTRACT

We present an unusual case of paraplegia which occurred on the second postnatal day. Investigations revealed a spinal mass at D-7 level. Histopathology of the tumor showed it to be a spinal metastasis from a solitary thyroid malignant nodule. The patient had laminotomy and biopsy, followed later by total thyroidectomy. She also had radiotherapy and radio-iodine ablation. We discuss the therapeutic modalities of such a condition.

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Papillary tumor is the most common of all thyroid cancers.[1] Their peak onset is between 30 and 50 years of age, and they are more common in females than male by a 3:1 ratio.[2] Typically, these arise as an irregular, solid or cystic mass that grows from an otherwise, normal thyroid tissue. This cancer has a high cure rate with 10 year survival rates for patients with papillary thyroid cancer estimated at 80-90%.[3] Cervical metastases are present in 50% of small tumors and in over 75% of the larger thyroid tumors. Distant metastases are rare, but lung and bone are the usual sites. Tumors that invade or extend beyond the thyroid capsule have a poor prognosis due to its high local recurrence rate. Prognosis is directly related to tumor size. Tumors <1.5 cm, have a very good prognosis. With adequate therapy, the overall cure rate can be as high as 100% for small lesions in young patients.[4-6] In this paper, we present an unusual combination of a silent solitary malignant thyroid nodule complicating pregnancy and early puerperium and causing paraplegia on the second postnatal day due to spinal metastasis. We describe the treatment modalities used and review the literature addressing mainly 2 issues: management of thyroid cancer during pregnancy, and care of paraplegic women in puerperium.

Case Report. A 35-year-old, married (gravida 2, Para 1, abortion O), Indian nurse, was admitted at 38 weeks of gestation for induction of labor due to oligohydramnios. She presented with productive cough of yellow sputum of 2 weeks duration and complained of recurrent episodes of backache, not relieved by analgesics. She was not known to have had any medical or surgical problems. First pregnancy was uneventful, and delivery was spontaneous at term of a live and healthy female baby, 4 years earlier. The baby is alive and well. The current antenatal history consisted of 6 visits to outpatient clinic between 14th to 38th week of gestation. In the second visit, she was discovered to have gestational diabetes, vulval varicosities, and a

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Figure 1 - Lateral computed tomography scan of the vertebral column showing distension of T7 vertebra.

Figure 2 - Transverse section at T7 vertebra with extradural tissue mass pushing the spinal cord to the left.

sub-urethral abscess, which was treated with antibiotic cream. On the third, visit she was found to have thrombosed hemorrhoids and was treated with Ultraproct cream. At 37th week, she complained of right-sided chest pain and upper backache. In the last visit, her main complaints were of fatigue and inability to lie down. An ultrasound confirmed a clinical impression of oligohydramnios. She was advised to be admitted for induction of labor. On admission, her physical examination and investigations were normal, the presentation was cephalic, engaged, and found to be already in early labor. She progressed into a spontaneous vaginal delivery of a live and healthy male baby who weighed 3449 gm. The Apgar score was 9 at one minute and 10 at 10 minutes. The third stage of labor was complete and uncomplicated. On the second postnatal day, she complained of severe backache, which was not radiating, but increased on moving or taking a deep breath. She experienced a gradual loss of movement in both hands and inability to sit in bed. The vital signs were normal, examination of the back revealed localized tenderness in the thoracic region on both scapulae. She was given Voltaren (diclofenac sodium) 75 mg intramuscular injection, followed later by Pethidine 100 mg, and Phenergan 50 mg. Chest x-rays in both antero-posterior and lateral views were requested. The patient lost power in both lower limbs rapidly and was unable to void urine although the bladder was distended. An urgent orthopedic and neurology consultation was made. Their findings consisted of a rapidly progressing weakness of lower limbs, the weakness was grade 1-2 and sensory level was at T8 which was also severely tender. As the lesion was suspected at T8 segment, MRI was advised and consent was taken for potential surgery. She was prescribed: Innohep (tinzaparin sodium) 0.45 ml injection daily, Zinnat (cephuroxime) 250 mg twice daily, Solu-Medrone (Methylprednisolone) by intravenous drip, initially 30mg/kg for 2 hours, followed by 5.5 mg/kg for 22 hours, and Zantac (Cemitidine) 50 mg 8 hourly. Her chest x-ray results were suggestive of granulomatous spondylitis at the T7 level with cord compression by extradural granulation. There was T7-8 diskitis. The picture was consistent with an early abscess or metastasis. The CT scan results showed distension of T7 vertebra with extradural tissue pushing the spinal cord to the left (**Figures 1 & 2**). In view of the above finding, it was decided to carryout emergency surgery on the third postnatal day for T6-7 decompression (laminectomy) and the excision of extradural tumor.

First surgery. The spinal canal was tight and the dural sac pushed backwards and to the left. There was an extra dural, grayish, hypovascular and friable tumor with the capsule growing out of the T7 vertebra. The tumor was identified to the right and anterior side. Laminectomy was performed followed by excision of the extra dural tumor. This area was drained with Redivac and the specimen sent for histopathological examination. Postoperatively, she was admitted to the intensive care unit (ICU) for closer observation, where she stayed for one week. Apart from monitoring she did not need any specialized treatment. On discharge from the ICU she was alert and conscious, neurologically she was improving. There was a small gaping of the back wound, which was resutured under local anesthetic. In the postnatal ward, she received physiotherapy and was put on a lumbar belt. Her condition continued to be stable and ambulant with support, there was no focal defects until her discharge from hospital 7 days later. Meanwhile, the histopathology report showed that the biopsy of a bony tissue from the extradural lesion at T6-7 revealed the features of papillary carcinoma metastasis. They advised to investigate the patient for a primary tumor in the thyroid gland. She was seen by the oncologist while still in the ward and who advised fine needle biopsy (FNAC) of the thyroid, radio-iodine uptake thyroid

scan, CT scan of abdomen and pelvis and thyroid ultrasound. Ultrasound of the thyroid revealed mild borderline thyromegaly. Small, well-defined foci were noted: one in each lobe and one in the isthmus. All looked benign unless proven otherwise. Findings were suggestive of a multi nodular goiter. Ultrasound of the abdomen showed no focal lesion in the liver, and both kidneys were normal. Ultrasound of the pelvis showed that there were no masses and the pelvic viscera was normal. Bone scan showed increased uptake of Technetium (Tc) noted at T7-8 with central lucency. Distribution of Tc elsewhere in the bony skeleton is within normal limits. The impression in correlation with the pathology findings, the scintigraphic appearance was almost certainly due to metastasis at T7-8. The FNAC results were inconclusive.

The Oncologist then recommended a course of radiation therapy to the dorsal spines, T4-9 level. She received a dose of 4000 C. Gy in 20 fractions over 4 weeks using 6 MV photons. This treatment was carried out on an ambulatory basis. During her radiation therapy, she developed mild dysphagia but otherwise tolerated the radiation therapy very well. During her sessions, she was noticed to have discharge from the back wound and on closer examination there was dehiscence so arrangement was made for resuturing.

Second surgery. Debridement and resuturing of the laminectomy wound were performed under general anesthesia. The postoperative period was uneventful. Ten weeks after delivery and when she completed her radiotherapy, in a joint meeting between the pathologist and the oncologist it was suggested that the plan was to refer her to the Surgical Department for a total thyroidectomy.

Third surgery. Under general anesthesia the patient underwent total thyroidectomy, and the specimen was sent for histopathological examination. The only abnormality observed during the surgery was a small nodule in the thyroid isthmus. Histopathology showed multiple sections studied of thyroid tissue with colloid nodules in the right lobe with an area of fibrosis and macrophages. The blood vessels showed focal calcification in the wall. The isthmus showed a focus 12 mm of papillary carcinoma cells arranged in papillary patterns. There was overlapping and ground glass appearances of nuclei. Occasional psammoma bodies were noted. The neoplastic focus was well defined and surrounded by fibrosis. Impression was papillary carcinoma of the thyroid.

Postoperatively, she remained stable and clinically did not manifest hypothyroidism. She was discharged home on the 13th postoperative day with an appointment to have a neck scan after 2 weeks, and advised to have radio-iodine ablation. As she was planning to go to India, she decided to have her iodine ablation there. Five months later, she returned from India with reports indicating that she completed her iodine treatment, that she has no neurological deficit, MRI scan of spines was normal and the thyroid function tests were within normal limits. She was receiving Eltroxin 250 micrograms daily. She is now symptom free, with no residual physical disability and returned back to her work.

Discussion. Backache is a very common feature of pregnancy with approximately half of all pregnant women experiencing some form of backache. It is often referred to as one of the 'minor ailments' of pregnancy, but some women suffer severe and even incapacitating pain. From an etiological point of view, it is generally classified into: causes which preexist pregnancy such as congenital deformities of the vertebral column, childhood bone diseases of the spines or other systemic diseases and poliomyelitis. The physiological changes of pregnancy may precipitate backache, increasing weight gain of pregnancy causes changes in the normal curvature of the spines. Hormonal changes such as the release of relaxin hormone during pregnancy also contributes to ligaments laxity of the pelvic joints which cause backache and difficulty in walking. Less common is backache which is due to incidental causes such as trauma, infection in or around the vertebral column and malignant infiltration or secondary metastasis from a neoplasm elsewhere in the body. Management options for backache are dependent on the underlying condition. In most cases, it is sufficient to advise on maintaining of good posture which includes sitting, lying, bending, lifting and carrying. Exercise also plays a role in treating women with weak back muscles. Pelvic girdle and Chiropractors can help to relieve backache. Orthopedics can deal with conditions such as sacroiliac joint dysfunction or the separation of the symphysis pubis. More complicated cases such as women with hip replacement secondary to sickle cell disease may require more specialized treatment. Paraplegia, however, is an exceptional event in pregnancy or puerperium. Usually, cases seen are either due to causes, which preexist the pregnancy and delivery or mostly traumatic due to road traffic accidents or other injuries.[7] Traumas sustained during labor such as in the cases of complicated spinal anesthesia[8] or difficult forceps delivery which may be followed by foot drop due to peroneal nerve injury, but rarely total paraplegia. Formerly, and still in certain parts of the developing world, a tuberculous lesion of the spine is not uncommon among young women. Other, acute conditions of the spinal cord such as transverse myelitis, cerebral metastasis of choriocarcinoma, intermittent porphyria with neurological manifestation or poliomyelitis may occasionally be the cause of paraplegia.[9]

The number of cases which we have seen in our practice is few and mainly preexists the pregnancy.

On review of the database of the Salmaniya Medical Complex the main referral hospital in Bahrain there was only one case in 6 years of paraplegia with urologic complications due to previous road traffic accident who came in labor, giving an incidence of approximately 1/60000 delivery. Our reported case is the only one which has occurred during the puerperium.

Although, paraplegia is a rare event during pregnancy it requires special care during pregnancy and delivery. Particular emphasis on regional anesthetic care and postnatal assistance which include: physiotherapy, care for the newborn, and domestic nursing help. When it occurs, for the first time in puerperium the problem is further compounded by the lack of preparation by the patient or her attending physician. The situation here is more acute requiring facilities and robust decision-making to deal with the disrupted ability of the mother to care for her baby, treating the underlying condition, and providing the women with ancillary nursing and social care. In the United States there are many organizations,[10] that provide information and consultation for pregnant paraplegic women which include handouts, booklets and websites, which providing seekers with information and lists of obstetricians and centres which are specialized to care for these patients.

The second issue in this case is the management of papillary thyroid cancer and its long term prognosis. Firstly, is there an adverse effect of the pregnancy state on the course of this disease? There is no evidence based proof that this may be so, but it is well known that the functions of the thyroid gland are increased during pregnancy. In fact, a slight enlargement of the thyroid may be observed for the first time during pregnancy and lactation. Considerable controversy exists when discussing the management of well differentiated carcinomas (papillary and even follicular). Some experts contend that if these tumors are small, and not invading other tissues then simply removing the lobe of the thyroid, which harbors the tumor, will provide as good a chance of cure as removing the entire thyroid. They site the low clinical tumor recurrence (5-20%) although small amount of tumor cells can be found in up to 88% of the opposite lobe thyroid tissues. They also point to some studies showing an increased risk of hypothyroidism and recurrent laryngeal nerve injury among patients undergoing total thyroidectomy. Proponents of total thyroidectomy site several large studies that show that in experienced hands the incidence of recurrent laryngeal injury and permanent hypoparathyroidism is low (2%). More importantly, these studies show that patients with total thyroidectomy followed by radioiodine therapy and thyroid suppression, have significantly lower recurrence rate and lower mortality when tumors are larger than 1.5 cm. Papillary thyroid cancer can be targeted by giving isotop 131. Again, not everyone with papillary thyroid cancer needs this therapy, but those with larger tumors, spread to lymph nodes or other areas, tumor that appears aggressive microscopically, and older patients may benefit from this therapy. In other words, this modality of treatment is extremely individualized according to many variables.[11]

It is conventional to provide patients who had total thyroidectomy with thyroid hormone replacement therapy for the rest of their life. As a matter of fact, the advantage of this therapy is not exclusive to replace the hormone in those who have no thyroid left, but to suppress further growth of the gland in those with some tissue left. There is now evidence that papillary carcinoma responds to thyroid stimulating hormone.[12] Recently it has been shown that thyroid hormone replacement therapy reduces recurrences and mortality among patients with papillary carcinoma of the thyroid.

In conclusion, this patient has received optimal therapy of this unusual case of paraplegia in the early puerperium which resulted from metastasis of a solitary malignant thyroid nodule. The prognosis as it has been pointed out is very good with a high chance of total cure.

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