

Transverse myelitis preexisting in pregnancy: A case report*

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ABSTRACT

Transverse myelitis is an acute inflammatory lesion of the spinal cord resulting in motor, sensory, and autonomic dysfunction. Pregnancy increases risk of complications depending on the level of the spinal cord lesion. Hence, a multidisciplinary approach is needed during prenatal period. This is a case of IB, a 32 year-old primigravid, a known case of Transverse Myelitis, initially seen at ten weeks age of gestation. Prenatal course was managed accordingly. She underwent primary cesarean section for arrest in cervical dilatation at 39 weeks, with an unremarkable post-operative course. There is an increased risk of preventable complications such as recurrent urinary tract infections, anemia, development of decubitus ulcers, premature labor and delivery and autonomic dysreflexia. It is imperative that during the prenatal period, the patient be monitored closely and referred to specialists for further management of these simple to fatal complications.

Keywords: Complications, Multidisciplinary approach, Pregnancy, Transverse myelitis

INTRODUCTION

Transverse myelitis (TM) is an acute inflammatory lesion of the spinal cord which results to motor, sensory, and autonomic dysfunction.¹ In the early stages, there is lower limb flaccid paralysis, with a sensory level commonly affecting the mid-thoracic area. It is often accompanied by dissociated sensory loss, with pain, temperature, and light touch sensation being affected, but joint position and vibration sense are well-preserved.² Furthermore, it does not affect the ability of a woman to conceive. In a published paper by the Transverse Myelitis Association in 2012, women affected with TM have the same chance of conception and likewise have the same risk of having a miscarriage before 20 weeks.

According to a review made by the Transverse Myelitis Consortium Working Group in 2002 entitled: *Proposed Diagnostic Criteria and Nosology of Acute Transverse Myelitis (ATM)*, TM occurs in one to four new cases per million people per year, affecting individuals of all ages with bimodal peaks between the ages of 10 and 19 years and 30 and 39 years. It has no sex or familial predisposition. It is characterized clinically by acutely or subacutely developing symptoms and signs of neurologic dysfunction in motor, sensory, and autonomic nerves and nerve tracts of the spinal cord. It is usually diagnosed using a proposed criteria which requires that all of the inclusion criteria and none of the exclusion criteria are fulfilled (Table 1).

The three main categories in the differential diagnosis of ATM are demyelination, including multiple sclerosis (MS), neuromyelitis optica (NMO), and idiopathic transverse myelitis; infections such as herpes zoster and herpes simplex virus; and other inflammatory disorders such as systemic lupus erythematosus (SLE) and neurosarcoidosis.³ It is essential that initially a compressive cause be excluded by Magnetic Resonance Imaging (MRI), then a detailed history and physical examination followed by focused investigations must be done as presented in the algorithm devised by Weinschenker (2008) on the diagnosis of ATM. Furthermore, if the spinal cord is found to be normal, the patient may be reassessed for other causes. Lumbar tap is done for abnormal MRI results to check for presence of inflammatory processes, if positive, the patient may be started on empiric treatment with steroids accompanied by plasma exchange. If with note of improvement using this regimen, the patient may further undergo lab tests such as NMO-IgG and repeat MRI for definitive diagnosis of ATM.

According to literature, only five cases of pregnancy with preexisting transverse myelitis have been reported in the English-language literature. Two were described with other spinal cord injury cases, without attention to the manifestation of transverse myelitis in pregnancy, one is a case report which aimed to describe the clinical course and treatment of paraplegia in pregnancy secondary to transverse myelitis in pregnancy and two additional cases were discussed by Berghella et. al in their paper on Transverse Myelitis in Pregnancy published in 1996 involving term vaginal deliveries, prevention of potential complications, such as anemia, preterm labor and

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Table 1. Criteria for idiopathic acute transverse myelitis.

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> • Development of sensory, motor, or autonomic dysfunction attributable to the spinal cord • Bilateral signs and/or symptoms (though not necessarily symmetric) • Clearly defined sensory level • Exclusion of extra-axial compressive etiology by neuroimaging (MRI or myelography; CT of spine not adequate) • Inflammation within the spinal cord demonstrated by CSF pleocytosis or elevated IgG index or gadolinium enhancement. If none of the inflammatory criteria is met at symptom onset, repeat MRI and lumbar puncture evaluation between 2 and 7 days following symptom onset meet criteria • Progression to nadir between 4 hours and 21 days following the onset of symptoms (if patient awakens with symptoms, symptoms must become more pronounced from point of awakening) 	<ul style="list-style-type: none"> • History of previous radiation to the spine within the last 10 years • Clear arterial distribution clinical deficit consistent with thrombosis of the anterior spinal artery • Abnormal flow voids on the surface of the spinal cord c/w arteriovenous malformation • Serologic or clinical evidence of the connective tissue disease (sarcoidosis, Behcet’s disease, Sjogren’s syndrome, systemic lupus erythematosus, mixed connective tissue disorder, etc)* • CNS manifestations of syphilis, Lyme disease, HIV, Human T-cell Lymphotropic Virus-1, Mycoplasma, other viral infection (e.g. Herpes Simplex Virus-1, Herpes Simplex Virus -2, Varicella Zoster Virus, Epstein-Barr Virus, Cytomegalovirus, Human Herpes Virus-6, enteroviruses)* • Brain MRI abnormalities suggestive of MS* <p>History of clinically apparent optic neuritis*</p>
<p>* Do not exclude disease-associated acute transverse myelitis.</p>	

delivery, decubitus ulcers, and autonomic dysreflexia with coordinated multidisciplinary management.

This case report will present a case of Transverse Myelitis preexisting in pregnancy, along its course during the prenatal period, and most especially the multidisciplinary approach done to prevent the expected complications.

CASE

This is a case of IB, a 32 year-old primigravid pregnancy uterine 39 weeks and three days age of gestation, who consulted for labor pains. She has unremarkable family and personal social histories. Her menarche was at the age of 12 with subsequent menses occurring every 28-30 days lasting for three days, consuming three pads per day not associated with hypogastric pains. Since age 30, she has been regularly consulting a gynecologist for her bilateral polycystic ovaries wherein she was advised observation and lifestyle modification.

Patient is a known case of Transverse Myelitis, diagnosed at the age of 15. Patient then had a three-day history of flu-like illness with noted spontaneous resolution of symptoms thereafter. No consult was done and no medications were taken until patient noted sudden onset bilateral lower extremity weakness and numbness from

the level of the umbilicus and urinary incontinence. At this time, the patient could not ambulate and was wheelchair-borne. She was then brought to *Philippine General Hospital* for consult where Magnetic Resonance Imaging, Computed Tomography Scan and Lumbar Tap were done, and patient was diagnosed with Transverse Myelitis. She was subsequently admitted for one month wherein she was administered with unrecalled corticosteroids and intravenous antibiotics. She also underwent physical rehabilitation for one month and was on close follow-up every two weeks for a year with regular consult until the year 2000 with note of gradual recovery of numbness from 80% to 90% and improvement of bilateral lower extremity weakness from not being able to ambulate to having been assisted with ambulation with crutches. However, the patient’s urinary incontinence did not resolve. In the interim, the following residual symptoms were noted: urinary incontinence, lower extremity numbness and weakness aggravated by prolonged standing and walking, and limping with no note of progression. Patient had regular bowel movement daily. She was last seen by her Neurologist in 2000 then the patient decided to come home to her province wherein no regular consult was done. She reported of episodes of recurrent urinary tract infection necessitating admissions. Prior to pregnancy, the patient had numbness from the umbilicus down to

her bilateral lower extremities, bilateral lower extremity weakness, limping while walking and urinary incontinence.

Her first prenatal check-up was at ten weeks and four days age of gestation. Fetal heart tones were appreciated on ultrasound and she had stable vital signs. At this time, baseline laboratory tests such as Complete Blood Count, Urinalysis, and HbsAg revealed normal results. On transvaginal ultrasound, there is a single live intrauterine pregnancy seven and four weeks age of gestation with good cardiac activity, normal ovaries and no subchorionic hemorrhage. Baseline neurologic examination was done which showed motor weakness of both lower extremities (Mini Motor Testing, MMT 3-4/5) while the rest of the neurologic examination such as sensory, reflexes, cranial nerves were normal. Initial plan was to refer the patient to the Neurology Service for co-management of her Transverse Myelitis and to do monthly urinalysis. She was seen by the Neurology service at 15 weeks and four days age of gestation. On Neurologic examination, patient was conscious coherent, oriented to three spheres, cranial nerves were intact, sensory deficits starting from 90% at the level of T10 going down to 40% thereafter, there was no dysdiadochokinesia, dysmetria and babinski noted. Motor weakness was noted on both lower extremities as 4/5 while both upper extremities were with normal strength at 5/5. She was assessed to have Transverse Myelitis, not in acute exacerbation and Neurogenic Bladder secondary to Transverse Myelitis. Plan at this time was to observe for progression of symptoms, and do Nerve Conduction Velocity if with progression of weakness. At 16 weeks and four days age of gestation, patient had urinary tract infection, underwent urine culture studies and was prescribed with Cefuroxime 500mg/tab one tablet every 12 hours for seven days. Patient was also referred to the Urology Service for co-management of the neurogenic bladder and possible recurrent urinary tract infection. On follow-up with Urology at 17 weeks, she had no febrile episodes, dysuria, abdominal pain and on physical examination she had stable vital signs with no flank pain. Plan of the service at this time was to refer to the Infectious Disease Service for further evaluation of the recurrent urinary tract infection and to do urodynamic studies post-partum and once cleared from infection. Furthermore, she had her regular prenatal check-ups and follow-up wherein she was counseled by all services that her present condition predisposes her to develop recurrent positive urine cultures which will require her closer follow-up and use of multiple antibiotics. Risk and possible complications were discussed and were understood by the patient well.

Urine culture studies were done monthly with results ranging from Extended Spectrum Beta-Lactamase *Escherichia coli*, *Klebsiella pneumoniae*, and *Alcaligenes faecalis*. She was given varied antibiotics such as Ampicillin-

Sulbactam, Macroclantin, Ertapenem and Ceftazidime, wherein the patient is compliant and with noted occasional clearance of infection. In the interim, patient denies progression of neurologic symptoms. She underwent regular prenatal check-up, Oral Glucose Tolerance Test done at 24 weeks showed elevated second hour blood glucose (66-159-143) and Congenital Anomaly Scan showed no obvious gross anomalies, pregnancy uterine 25 6/7 weeks age of gestation, breech in presentation, live with good cardiac activity, estimated fetal weight 878g, adequate amniotic fluid volume at 16.12cm, grade 2 placenta with no previa. She was then referred to Clinical Nutrition and underwent Capillary Blood Glucose monitoring daily which showed fasting glucose of 65-81 mg/dl and 2-hours post-prandial glucose 72-105 mg/dl.

At 34 weeks, patient had her prenatal checkup, denies subjective complaints, fetal heart tones were 130 bpm, fundic height was 33cm. During this time, she was cleared by the Neurology Service for trial of labor but under close monitoring, and was also referred to Cardiology and Anesthesia Services for clearance prior to contemplated procedure due to the risk of dysautonomia. She was eventually cleared by both services to undergo trial of labor with close monitoring. Discussion of the patient's case by the Obstetrics and Gynecology, Neurology, Urology, Infectious Disease, Anesthesiology and Cardiology services was facilitated wherein the mode of delivery, plan for the type of anesthesia, and risk stratification prior to contemplated procedure were tackled. The plan of the Anesthesiology Service at this time was total intravenous with local anesthesia for trial of labor, or general anesthesia, if for cesarean section. Patient at this time has asymptomatic bacteriuria and undergoes intermittent straight catheterization while on Macroclantin 100mg/tab once a day until term. She was seen at the Cardiology Clinic wherein she had no reports of episodes of blood pressure elevation, palpitations, and difficulty of breathing. She was cleared by the service prior to contemplated procedure. Prior to admission, neurologic examination showed motor weakness from the level of L3 going down (MMT 4/5) and sensory deficits starting from 90% at the level of T10 going down to 40% thereafter.

At 36 weeks, the patient began to note irregular uterine contractions, continued to undergo prenatal check-ups weekly and was advised on labor precautions. On physical exam, she had stable vital signs and internal examination done showed closed cervix initially. On the day of admission, the patient came in for labor pains. She reported of good fetal movement not associated with watery or bloody discharge. On physical examination, she had stable vital signs, fundic height was 31cms, internal examination revealed cervix is dilated to three centimeters, with 60% effacement, station -2/5 with

intact bag of waters. She had mild to moderate uterine contractions occurring every five to six minutes. Neurologic examination at this time showed, orientation to three spheres, intact cranial nerves, motor weakness from the level of L3 going down (MMT 4/5) and sensory deficits starting from 90% at the level of T10 going down to 40% thereafter, there was no dysdiadochokinesia, dysmetria and babinski noted. Labor progression was monitored closely. She was also referred to Urology, Endocrinology, Neurology, Infectious Disease and Cardiology Services during this admission. Patient was started on Ceftazidime 2g per IV every 8 hours as suggested by the Infectious Disease Service and while the patient was on NPO, she was hooked to D5-containing fluids and capillary blood glucose were monitored every 4 hours. During this time, internal examination showed cervical dilatation of five centimeters, 70% effacement, station -3/5 with intact bag of waters, with strong contractions occurring every four to five minutes. Labor was augmented using oxytocin, and spontaneous rupture of membranes was noted with clear amniotic fluid. However, there was note of protracted labor at cervical dilatation of seven centimeters, 80% effacement, station -2/5, ruptured bag of waters for four hours. She then underwent primary cesarean section for arrest in cervical dilatation under general anesthesia. Patient was hooked to cardiac monitor prior to induction of general anesthesia with stable vital signs. Pediatric service were informed of the procedure and case. No intraoperative cardiac monitoring was warranted since the patient was asymptomatic and cleared as outpatient for the procedure. She tolerated the procedure well and had an unremarkable post-operative course.

DISCUSSION

In pregnancies with preexisting transverse myelitis, there is an increased risk of preventable complications such as recurrent urinary tract infections, anemia, development of decubitus ulcers, premature labor and delivery and autonomic dysreflexia, depending on the level of the spinal cord involved.

Recurrent urinary tract infections (UTI) may be due to sensory and motor disruption of the bladder and ureters resulting in inability to void, urinary stasis and incontinence. Chronic indwelling catheters and intermittent catheterization may also contribute to this. Such infections predispose the patient to urinary reflux, development of nephrolithiasis and ureterolithiasis and eventually chronic kidney disease. Also, the enlarging gravid uterus may cause ureteral compression and may aggravate the urinary reflux, increasing the risk of pyelonephritis and urosepsis. As reported by Berghella et.al (2002) involving a case series of 2 pregnant patients

with preexisting transverse myelitis, both patients required self-catheterization every 4-6 hours in the first and second trimester because of urinary stasis and experienced urinary infections. In the third trimester, both patients increased the frequency of catheterization to every 3 hours due to increase in blood volume and renal clearance. Ascending skin infections was reduced by advising perineal hygiene prior to doing catheterization. Furthermore, once infection occurs, aggressive IV treatment was initiated. For our case, prior to pregnancy, the patient has been having UTI at least twice per year which necessitate admission for IV antibiotics. On the first prenatal check-up the initial plan was to do urinalysis monthly for surveillance of urinary tract infection. At 16 weeks she had UTI and was advised to undergo urine culture prior to initiating oral Cefuroxime 500mg/tab 1 tablet every 12 hours for 7 days. At this early time, patient was referred to Urology for co-management of neurogenic bladder and to Infectious Disease for possible recurrent urinary tract infection. Plan at this time is to do urodynamic studies post-partum and once cleared from infection. During the course of her pregnancy, patient denies febrile episodes and dysuria. Urine culture studies were done frequently with results ranging from Extended Spectrum Beta-Lactamase *Escherichia coli*, *Klebsiella pneumonia*, and *Alcaligenes faecalis*. She was given varied antibiotics such as Ampicillin-Sulbactam, Macroclantin, Ertapenem and Ceftazidime, wherein the patient is compliant and with noted occasional clearance of infection.

Anemia may occur in pregnant patients with transverse myelitis only in those with history of chronic pyelonephritis, decubitus ulcers and/or renal failure. Both studies by Young et.al (1983) and Verduyn (1986), reported of 12% occurrence of anemia in patient with transverse myelitis and spinal cord injuries, respectively. This is in contrast to the study of Berghella et.al, wherein the patient included in the case series had normal complete blood counts. In our case, the patient had complete blood count every trimester and at term wherein results showed normal results with the following hemoglobin, respectively, 12.6mg/dl, 13 mg/dl, 13.6 mg/dl and 12.8 mg/dl.

Patients affected with transverse myelitis use walkers and wheelchairs for ambulation. In pregnancy, with accompanying weight gain and increase in uterine size, there may be increasing difficulty in ambulation as the gestation progresses, this may lead to further restriction in mobility. Decubitus ulcers may develop if not encouraged to continue ambulation. In our patient, the patient is ambulatory although with difficulty described as dragging her right foot. There was no development of decubitus ulcers. Similarly, in the study by Berghella et.al, there was no development of decubitus ulcers since patient

underwent meticulous physiotherapy, skin care and was well educated on frequent position changing and daily bed and wheelchair exercises.

The risk of preterm delivery is increased in patients with transverse myelitis because of their inability to perceive early signs of labor which depends on the functional level of the spinal cord lesion involved. Defects below T-11 may have distal sensory and motor deficits but uterine contractions will still be perceived. In lesions involving T6-10, contractions are perceived but not painful. In patients with complete transection of the cord above T6, there is no perceived uterine activity. In the latter case, frequent cervical examination in the late 2nd and 3rd trimesters may be necessary. In the study of Young et.al, there was no reported preterm labor similar to the study by Berghella et.al, wherein the 2 patients' defects were at T11 and incomplete C-6, respectively. In our case, the patient's spinal cord lesion was found to be at the level of T6. She began to perceive uterine contractions at 36 weeks and was admitted at 39 weeks for trial of labor. In addition to the inability to perceive uterine contractions due to disrupted innervations to specific levels of the spinal cord, TM patients are more predisposed to develop preterm labor due to recurrent urinary tract infections which causes inflammation leading to production of inflammatory cytokines and prostaglandins.

Autonomic dysreflexia is the most dreaded complication of transverse myelitis in gravid patients. It is caused by a loss of descending control over sympathetic spinal reflexes distal to the level of the spinal cord lesion. Stimulation of somatic or visceral sensory nerves below this level leads to uncontrolled sympathetic outflow which causes vasoconstriction and hypertension. Hypertension can be so severe as to cause intracranial hemorrhage and even death.⁷ According to Baker et.al (1992), it occurs in approximately 85% of pregnant women with spinal cord lesions at or above the sixth thoracic vertebra. Symptoms do not usually occur until 72 hours after cord injury. Although our patient did not exhibit any signs of autonomic dysreflexia during pregnancy, she was still considered predisposed to develop this condition. Furthermore, she was referred to Cardiology service at 34 weeks and was cleared as outpatient for contemplated plan of delivery.

In addition, the anesthetic management and plan were discussed prior to term. According to the case report of Walsh, Grange and Beale in 2009, general anesthesia was successfully used for a patient with acute transverse myelitis during elective cesarean section. Furthermore, several cases have been reported following neuraxial techniques and general anesthesia. Seven cases of gravid patients with TM were identified, 4 among which had preexisting TM while 3 where acute onset. Two among the patients with preexisting TM received epidural anesthesia

for trial of labor, another delivered by elective cesarean delivery under general anesthesia block and the last patient opted to proceed vaginal delivery without anesthesia. The three acute onset TM patients had cesarean deliveries, one with general, and one with epidural anesthesia. For our case, the Anesthesiology Service had a conference discussion the plan of anesthesia and the consensus was to total intravenous with local anesthesia for trial of labor, or general anesthesia, if for cesarean section.

SUMMARY

In patients with preexisting transverse myelitis prior to pregnancy, there is an increased risk of preventable complications such as recurrent urinary tract infections, anemia, development of decubitus ulcers, premature labor and delivery and autonomic dysreflexia, depending on the level of the spinal cord involved. It is imperative that during the prenatal period, the patient be monitored closely and be referred to specialists for further management of these simple to fatal complications. Recurrent UTI is due to the neurogenic bladder caused by the spinal cord lesion; its occurrence may be alleviated by doing regular urinalysis and urine culture studies and by judiciously prescribing the patient with antibiotics sensitive to the infecting organism. Anemia, which did not occur in our patient, is also precluded by preventing decubitus ulcers, chronic pyelonephritis and chronic kidney disease from happening. Meanwhile, with accompanying weight gain and increase in uterine size, there may be increasing difficulty in ambulation as the gestation progresses, which may lead to further restriction in mobility and development of decubitus ulcers. Patients may be encouraged to ambulate to prevent this. Premature labor and delivery depends on the level of the spinal cord affected; patients with lesions T6 and above may need closer monitoring by doing frequent cervical examination during the third trimester. Autonomic dysreflexia is common in patients with TM, and it is clinically diagnosed by the occurrence of the following sympathetic signs: blood pressure elevation, palpitations, increased sweating and blurring of vision. Even prior to the occurrence of the said symptoms, they may be referred to Cardiology service for closer monitoring and evaluation. Lastly, it is important that the mode of delivery and type of Anesthetic to be used be discussed prior to delivery with all services.

Therefore, a multidisciplinary approach in the management of patients with transverse myelitis is imperative in order to have an uneventful peripartum and intrapartum period. ■

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