**Case Report**

**Collaborative Care for a Pregnant Woman with Spinal Cord Injury**

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**Abstract**

AA is a 29-year-old female with T7 AIS-A complete paraplegia. Her initial injury resulted from a motor vehicle collision in 2011. Tragically, in addition to the loss of her mobility, her two-month-old son died in the accident. Following spinal cord injury (SCI) Rehabilitation, AA presented for care as she was unexpectedly pregnant at 12 weeks gestation. An interdisciplinary team of healthcare providers collaborated to assist AA in her pregnancy, including a perinatologist, physiatrist, OB clinical nurse specialist, SCI sexual health nurse, rehabilitation nurse, community health nurse, outpatient and community occupational therapists, and a social worker. The team met three times to assess equipment needs, plan for a safe delivery, organize postnatal home personal care, and provide newborn baby support services. Prior to pregnancy, AA had developed chronic back pain secondary to deterioration of rods in her back; the plan was for a revision procedure. As a result of her unknown scar location from her previous cesarean section (CS) and presence of increasing back pain, a repeat elective CS under general anesthetic was planned, preceded by an elective ante partum admission a week prior to surgery. Ten days prior to her scheduled CS date, AA was admitted to hospital with pregnancy complications and delivered via urgent CS under general anesthesia. There is limited information that is published on the care of women with SCI following C-section delivery. The extensive planning process resulted in this patient with many complicated risk factors to be discharged from hospital in six days, with postpartum resources and follow-up in her home community in place. This report is meant to help guide clinicians with management of women with similar challenges by considering clinical needs met by Rehabilitation, Sexual Health, and Obstetrics teams.

**ABBREVIATIONS**


**INTRODUCTION**

We report the case of a 29-year-old pregnant female, evaluated as T7 AIS-A complete paraplegia. The patient came to GF Strong Rehabilitation Centre in Vancouver, British Columbia, arriving from the Middle East. Her case demonstrates the complexity of pregnancy management in a spinal cord injured patient. Our hope is that this report will help guide clinicians with management of women with similar challenges by considering clinical needs to be addressed by her Rehabilitation, Sexual Health, and Obstetrics team.

**CASE PRESENTATION**

AA is a 29-year-old female who predominantly speaks her language of origin. She and her husband had come to Canada in 2014, and she was seeking care for her chronic spinal cord injury (SCI). Her initial injury was secondary to a motor vehicle collision in 2011, resulting in T7 AIS-A complete paraplegia. Following her injury, AA did not immediately receive treatment but waited four months until she was seen in a different country to have spine
stabilization surgery. The health records pertaining to her injury and subsequent surgery were unavailable and mostly reported by the patient. Tragically, in addition to the loss of her mobility, her infant son (age two months) died in the accident. AA reports that she had minimal rehabilitation in her country of origin. AA was first admitted to GF Strong for SCI Rehabilitation with the goal to learn to become independent in Activities of Daily Living (ADLs). Most of her care was done by her husband previous to her rehabilitative care at GF Strong. She was provided with a power wheelchair due to worsening low back pain and carpal tunnel syndrome. Investigations of her thoracolumbar spine revealed deterioration and mal-alignment of the spine. A referral for surgical revision was initiated and ultimately, elective surgery was proposed.

AA had no initial plans on becoming pregnant. Sexual health education, birth control options, and support in decision making were provided by the GF Strong Sexual Health Team. AA was connected to a family practitioner who spoke her native language. Subsequently she was referred to an OB/Gynecologist to discuss reproductive health and assess fertility. AA sought care for reproductive screening at the Access Clinic, which provides reproductive health care for women with disabilities who cannot otherwise access these services in their primary health care providers’ office. She had a Papanicolaou (Pap) test done, facilitated by the wheelchair accessible exam table found at this clinic. After 8 weeks of inpatient rehabilitation, AA was discharged home initially planning to live on her own. Social work support provided assistance with social integration concerns. The SUCCESS Program as well as immigrant services provided liaison communication between rehabilitation and community issues.

Eight months after discharge, AA presented to the outpatient rehabilitation team unexpectedly pregnant at 12 weeks gestation. She stated that she and her husband were reunited. Multiple barriers to coordinated care became apparent, including 1) lack of interpreter services outside of institutional settings, 2) lack of system support for coordination of care, 3) lack of knowledge by the patient about the impact of SCI and pregnancy, and 4) lack of knowledge of and ability to navigate the health care system. She was referred by her family doctor to the Maternal Fetal Medicine group at BC Women’s Hospital and Health Centre (BCWH) at 25 weeks of gestation. Once her consistent primary care provider was established, a team of healthcare providers was constructed to collaborate in care for AA in her pregnancy. This team included a perinatologist, physiatrist, OB clinical nurse specialist, SCI sexual health nurse, rehabilitation nurse, community health nurse, outpatient and community occupational therapists, as well as a social worker. Team members were included to maximize the contribution of specialized knowledge from both rehabilitation and obstetrics disciplines to improve care for AA. This team met three times throughout AA’s pregnancy to assess equipment needs, plan for a safe delivery, organize postnatal home personal care, and provide newborn baby support. An individualized Advanced Care Plan was created to guide AA’s pregnancy care and plans for delivery. Language interpretation was available for all appointments, case planning meetings, and consultations throughout her care.

**DISCUSSION**

The issues that were discussed and presented challenges include:

**Urinary tract infections**

Throughout her pregnancy, AA was hospitalized three times for management of urinary tract infections. The infections often caused the uterus to contract, which mimicked preterm labour. Despite the lack of strong evidence to support UTI prophylaxis [1]. AA was started on nitrofurantoin following the second UTI. However, this intervention was not effective. At 36 weeks gestation, her urine cultures were positive for Stenotrophomonas maltophilia, sensitive to moxifloxacin, ceftazidime, and trimethoprim/sulfamethoxazole. Due to the difficulty in managing this infection in a pregnant woman, infectious disease specialists and microbiology lab medical personal were consulted. It was determined that the best choice was treatment with three doses of intramuscular ceftazidime. Like the women in Bertschy’s study [2], AA’s bladder management was changed from intermittent catheterization program to insertion of an indwelling catheter.

**Gestational diabetes**

AA was diagnosed with gestational diabetes mellitus requiring insulin. The BC Women’s Hospital Diabetes Service provided counseling and daily follow-ups with AA. She was started on insulin immediately following her diagnosis, and her diabetes was well controlled throughout her pregnancy. Given this diagnosis, the decision was made to plan her CS delivery at 38 weeks, a week earlier than the hospital’s standard of 39 weeks gestation.

**Anemia**

AA was diagnosed with iron deficiency anemia during her pregnancy. While the mainstay of treatment is oral supplementation with iron, AA was cognizant of the constipating side effects with underlying neurogenic bowels. A plan was made to administer IV iron sucrose during her inpatient ante partum admission before delivery.

**Accessibility**

According to lezzoni et al[3], women with mobility challenges often have difficulty accessing the doctors’ office for prenatal care. It is important that a physician’s office have adjustable height examination tables and wheelchair accessible weight scales available for pregnant women with physical disabilities.

At BC Women’s, there is an outpatient exam room equipped with a ceiling lift that doubles as a scale to track weight progression. Furthermore, to assist with transfers from the wheelchair to exam table, the tables have electrically powered height adjustments. Finally, a designated wheelchair accessible room with a ceiling lift is available for women with disabilities during their post-natal care.

**Autonomic Dysreflexia**

Autonomic Dysreflexia (AD) is considered a medical emergency in SCI patients [4]. Inciting events such as over distended bladder or bowel or any noxious stimulus below...
the level of injury, including the onset of labour, can lead to dangerously high blood pressure and symptoms of headache, flushing, nausea, and facial sweating. Those with spinal cord injuries rostral to T6 are at risk for AD [5]. Although AA’s SCI level is at T7 with the possibility of AD, she had not demonstrated any previous episodes. Therefore, according to Sharpe et al [6], she would be less likely to have AD during delivery.

**Change in function**

Functionally, AA was independent with all ADLs prior to pregnancy and maintained most of her independence, even with her growing abdomen. AA used a transfer board for transfers. However, this method of transfer became more difficult as her pregnancy progressed, as it was more uncomfortable to lean forward through her trunk. Further in her pregnancy, she began to require assistance with her bowel routine, as digital stimulation and disimpaction became more awkward.

During the pregnancy, a community occupational therapist (OT) was consulted to assess AA’s living environment. The OT recommended renting an overhead lift for when the patient could no longer perform board transfers. She was regularly monitored for her ability to continue to do effective weight shifts for pressure relief. As AA’s pregnancy progressed, her power wheelchair required adjustments to her seatback to provide more recline. She was encouraged to increase her use of power tilt rather than lifting herself. Skin integrity management was a significant concern. According to Camune [7], inspection of the skin of the thighs, back, and buttocks should be performed daily and at prenatal visits. She was advised to have more frequent skin checks, twice daily by her husband. She spent the majority of time in her bed rather than her wheelchair. She did have a small area of recurrent skin breakdown over the apex of her kyphosis on the spinous processes. Although this was an issue prior to her pregnancy, the skin was closely monitored and seating adjustments were made as this area received more pressure with the pregnancy body changes. During sessions at GF Strong Rehabilitation centre with the Rehab OT, AA was taught adaptive techniques for lifting and carrying her baby using a weighted baby doll and trialing a variety of baby slings. Methods of lifting her baby into her own hospital bed for feeding were simulated and a baby bassinette was selected, which allowed for ease of this task without requiring her to transfer out of her own bed.

**Method of delivery**

Given that AA had previously delivered via cesarean section outside of Canada, the team did not have access to formal records of the birth. The perinatologist discussed both options for delivery including repeat CS and vaginal birth after cesarean section (VBAC) with AA. Repeat CS was chosen as it was more compatible with the patient’s unique complex social and physical circumstances. AA agreed to have an elective repeat CS with the stipulation that she would attempt a trial of labour after cesarean section (TOLAC) if labour onset was spontaneous prior to scheduled CS date. A BC Women’s anesthesiologist did an extensive review of the possible complications resulting from the deterioration of the surgical rods in her back and recommended that AA not have a regional anesthetic for her CS. At 36 + 2 weeks gestation, approximately ten days prior to her scheduled CS date, there was noted maternal hypertension during routine monitoring and AA was admitted to hospital. Due to this complication of her pregnancy and the proximity to her scheduled date, she was delivered via urgent cesarean section under general anesthesia. AA did have complications of excessive postpartum bleeding that were managed in the operating room. Otherwise, no other concerns were noted. There was extensive discussion with the team about AA’s healing time after surgery. There is insufficient evidence to adequately predict the minimally required healing time of denervated tissue to withstand the range of physical stresses/activities she would need for self mobilization with mechanical aids. From animal models, we know that denervated muscles have delayed healing time [8]. Furthermore, we needed to be confident that the sutures would hold securely with increased abdominal pressure when she performed a transfer or anterior weight shift. A major consideration was made to use non-absorbable/delayed absorbable sutures for AA instead of the standard absorbable sutures. This was highlighted in AA’s Care Plan prior to surgery.

**Postpartum care and discharge planning**

AA was moved to a postpartum room that was adapted to accommodate patients with disabilities. The nursing care was adjusted so the nurse had a lesser load of two Mom-baby dyads to care for instead of four dyads. This allowed increased time to adequately support AA in her transition to motherhood and the establishment of breastfeeding. The outpatient OT and the perinatal clinical nurse specialist worked together to facilitate home support workers (HSW) to provide personal care to AA during her hospital stay. A Memorandum of Understanding (MOU) was created, which outlined the exact care that would be provided by the HSW while onsite at the hospital. This MOU was vetted by hospital Risk Management and the Manager of the Community Health Unit overseeing the outpatient postpartum care. Furthermore, the public health nurse and perinatal clinical nurse specialist collaborated to arrange for postpartum doula care to provide AA with assistance with baby care following discharge. Lastly, the potential for postpartum depression was recognized. Reproductive Mental Health psychiatrist visit occurred while AA was on the postpartum unit with appropriate language interpretation. Follow-up appointments were arranged prior to discharge.

**SUMMARY**

Over the last decade, our center has managed the births of many women with spinal cord injury and supported them to deliver their babies safely; some women with SCI had more than one child under our care. Increasing numbers of women with SCI are choosing to become mothers. These women have increased our knowledge about ways to adapt care to improve outcomes. Generally, with our support, most of these mothers were able to give birth vaginally; very few women required CS. There is limited published information on the care of women with SCI following CS delivery. We reiterate the importance of the interdisciplinary and inter-specialty team collaboration to plan for the successful delivery in a pregnant patient with SCI. We advocate for spinal cord injured women who are planning to become pregnant to seek the care of a sexual health rehabilitation clinician, as well as an
OB specialist for pre-pregnancy counselling. When the pregnancy is confirmed, it is important that the OB care provider seek the input of a rehab team that includes a physiatrist, nurse, social worker, and occupational therapists to guide the comprehensive planning process required to support and manage the safe delivery. We found that scheduling a team meeting early in the second trimester allowed time to organize and plan for support during pregnancy, delivery, and post partum care. Our extensive planning process resulted in this family with many complicated factors be able to be discharged from hospital in six days, with postpartum resources, and follow-up in her home community in place.

REFERENCES

2. Bertschy S, Geyh S, Pannek J, Meyer T. Perceived needs and experiences with healthcare services of women with spinal cord injury during pregnancy and childbirth — a qualitative content analysis of focus groups and individual interviews. BMC Health Serv Res. 2015; 15: 234.