CASE REPORT

Successful pregnancy in a woman with paraplegia

Jorge Santos Castro,¹ Cátia Lourenço,² Marcelina Carrilho²¹Centro Hospitalar de Vila Nova de Gaia, Vila Nova de Gaia, Portugal²Department of Obstetrics/Gynecology, Centro Hospitalar de Vila Nova de Gaia, Vila Nova de Gaia, Portugal**Correspondence to**

Dr Jorge Santos Castro, jorgecastro703@gmail.com

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SUMMARY

Pregnancy is a rare occurrence in patients suffering from spinal cord injury (SCI). Pregnancy in these patients presents unique challenges to obstetric care providers, who need to become familiar with the general principles of care in this setting. SCI alters the function of multiple organ systems and chronic medical conditions are common in this patient population. Certain medical complications such as urinary tract infections and autonomic hyper-reflexia, or autonomic dysreflexia, are expectable and can be managed successfully. A multidisciplinary team should care for delivery in these patients. The authors present a case of a pregnancy in a paraplegic woman whose lesion was at the level of T4. She received epidural analgesia and had a caesarian section. From this case, the authors aim to point out the specific concerns of the management of pregnancy and delivery in this setting emphasising the importance of a multidisciplinary team, specially obstetricians and anaesthetists.

BACKGROUND

The global incidence of spinal cord injury (SCI), both traumatic and non-traumatic, is likely to be between 40 and 80 cases/million. Based on the 2012 world population estimates, this means that every year between 250 000 and 500 000 people suffer an SCI.¹ In the USA approximately 1000 new SCI are reported per year in women aged 16–30 years. Pregnancy in this patient population presents unique challenges that require a multidisciplinary approach. Beyond acute clinical problems related to SCI, many chronic medical issues arise. These women are more prone to develop urinary tract infections, constipation, anaemia and orthostatic hypotension. Impairment of thermoregulation, which can complicate intrapartum management, may occur as well. Also pulmonary function can be damaged, especially with lesions above T5 level. However, the most serious potential complication is autonomic dysreflexia (ADR), which may pose severe complications, and must be differentiated from pre-eclampsia.²

CASE PRESENTATION

We describe the clinical case of a paraplegic 36-year-old woman who conceived spontaneously and was followed up in our tertiary care unit. The patient, gravida II para I (1 previous vaginal birth 9 years before) had a road traffic collision 8 years ago, which resulted in a T4–T5 vertebral column fracture and total medullary section. She had no other relevant medical issues and her family history was unremarkable. She was referred by her general

practitioner to our hospital for follow-up by the ninth week of gestation.

INVESTIGATIONS

The patient was offered first trimester scan and biochemical screening, the latter having a result considered high level of risk for trisomy 21, with nuchal translucency (NT) of 2.7 mm. Other aspects of the scan were considered normal. Chorionic villus biopsy was performed at 16 weeks and 1 day of gestation. Although we generally perform this examination from the 13th to 15th week, the patient developed a *Pseudomonas aeruginosa* urinary tract infection by 14 weeks, and had to be admitted at our unit for intravenous antimicrobial therapy, leading to postponing chorionic villus biopsy. During her hospital stay, she had spasticity symptoms and a rehabilitation physician was asked for collaboration, but no additional measures were considered necessary, beyond her usual medical treatment. This included baclofen (a muscular relaxant), oxybutynin (an anticholinergic drug), omeprazole and a laxative drug. Enoxaparin 40 mg/day was prescribed as well since 16 weeks. The result of the karyotype was 45, XY, der (13;14) (q10;q10) mat. This represents a male fetus having a Robertsonian translocation between chromosomes 13 and 14, of maternal origin. The genetics consultant's opinion was that no congenital anomalies should be expected, as these were non-existent in this patient, who had a karyotype 45, XX, der (13;14) (q10;q10). The male progenitor had a normal karyotype.

TREATMENT

The patient was discharged 1 day after chorionic villus biopsy and was followed up as outpatient during the entire pregnancy. She had regular appointments every 2–3 weeks. Urine cultures were made at least in a monthly pattern, many of them revealing urinary tract infection, which were treated according to antibiotic susceptibility tests. *Escherichia coli* is the most frequent agent found; some of the antibiotics used were nitrofurantoin and ceftazidime. The patient performed urinary self-catheterisation during the entire pregnancy, each catheterisation lasting for 2 weeks. Anomaly scan, at 20⁺³ weeks and third trimester scan, at 28⁺⁴ weeks revealed no abnormalities. A cardiac scan was also conducted at the 21st week, with normal results. Another scan was performed at 39 weeks and 4 days in order to programming labour, the examination revealing a weight estimate of 3365 g. Routine pregnancy analytics were unremarkable. During pregnancy, delivery mode was discussed with the patient. There was a maternal request for caesarean section (c-section) given the

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patient's concerns of being unable to feel contractions at the onset of labour. She was offered admission at our unit at 37 weeks and was informed about vaginal birth, its advantages and reasons because of which it was advisable. Still, she insisted on having a c-section. An appointment with an anaesthetist was scheduled to discuss analgesic procedures during labour, and the benefits of spinal anaesthesia and of epidural analgesia were explained. She accepted this procedure.

OUTCOME AND FOLLOW-UP

At 39⁺₆ weeks she was admitted for elective c-section, performed under spinal anaesthesia at L3–L4 level. She gave birth to a male baby, weighing 3315 g and with an Apgar score of 9–10 (1st and 5th minute). Two obstetricians, two anaesthetists and one neonatologist were involved in the entire process. Puerperium was uneventful. Enoxaparin was stopped by the sixth week postpartum.

As for the child, his physical examination at birth was considered normal, with no signs of abnormal karyotype, but follow-up in paediatric genetics is being performed to this child. He presents until today (2 years and 11 months old—was born in 10 January 2011), normal psychomotor development and no phenotypic abnormalities. His elder brother was investigated, having a normal phenotype and karyotype.

DISCUSSION

The patient had a road traffic collision 8 years ago, due to which some clinical issues were already present before pregnancy. Acute SCI often results in transient amenorrhoea, but the majority of patients resume normal menses within 6 months and fertility is not impaired in women with SCI.^{3–4} Our patient actually had regular cycles, even after her accident, and conceived spontaneously. Because of multiple medical issues, patients with SCI planning pregnancy should be referred for preconception counselling. Trauma is the leading cause of SCI, but if SCI is of congenital or hereditary origin, genetic counselling must be taken.² The patient had an increased NT, and for that reason, a chorionic villus biopsy was performed, revealing the aforementioned result, which was not expected to pose any particular problem, although not revealing a completely normal karyotype. According to literature, patients with acquired SCI are probably at no greater risk than the general obstetric population for either congenital malformations or intrauterine fetal death.^{3–5–6} However, this patient was under medication of unknown effects during pregnancy, and this was the reason why a cardiac scan was also performed. The drugs she was administered belong to class B or C (B: no controlled studies have been conducted in humans; animal studies show no risk to the fetus; C: no controlled studies have been conducted in animals or humans), according to the Food and Drug Administration classification of risk (1979).⁷ Apparently there was no harm to fetal development, as physical examination at birth and psychomotor development for a period of almost 3 years have been considered normal. Other routine pregnancy tests were performed exactly as usual, with the exception of a prelabour scan, at 39 weeks, in order to assess fetal well-being and weight estimation for programming labour issues.

She had several urinary infections during pregnancy, one of them leading to hospital admission for treatment. In fact urinary tract infections and asymptomatic bacteriuria occur frequently in patients with SCI.² This happens for many reasons, like indwelling catheters, which was the case of our patient, or neurogenic bladder. Most authors and the American College of Obstetricians and Gynecologists recommend frequent urinary

cultures or antibiotic suppression.^{8–10} We asked for urine cultures at least every 3 weeks and for some periods prophylactic nitrofurantoin was prescribed, in the second trimester.

While hospitalised she had symptoms of spasticity, which she attributed to constipation, as she referred that even before pregnancy periods of constipation led her to develop these same symptoms. During the entire pregnancy she had no other such episodes. Episodes of constipation can actually lead to ADR phenomena but fortunately this was not the case.² Stool softeners and high-fibre diet are recommended in these patients, and so in her case as well.

In these patients decubitus ulcers can also occur. Excess weight gain and immobilisation contribute to this problem.² Our patient had only immobilisation of inferior limbs and had a weight gain of 12 kg during the entire pregnancy. She did not have pressure ulcers.

Pregnant paraplegic women can also have impairment of pulmonary function, especially in patients with high thoracic or cervical spine lesions, usually above the T5 level. Some authors recommend baseline and serial pulmonary function tests to assess vital capacity and possible need for ventilator assistance in labour.^{8–9} These, however, were not performed as this patient never had clinical signs of pulmonary difficulty.

Anaemia is another possible complication of pregnancy in these patients. It should be treated aggressively, and could decrease the risk of decubitus ulcers.¹¹ Iron supplementation and stool softeners were prescribed to our patient and she managed to go through most of her pregnancy without constipation. This way she maintained haemoglobin levels around 10–11 g/dL.

There is insufficient data at this time to recommend universal thromboprophylaxis during pregnancy or the puerperium for all patients with SCI; and each case should be addressed individually based on the patient's physical limitations and medical history.² In our case, we found it appropriate and hence prescribed it.

Patients with SCI are susceptible to orthostatic hypotension. In addition to the overall reduction in systemic vascular resistance accompanying pregnancy, SCI results in the loss of sympathetic innervation below the level of the spinal cord lesion, which leads to increased tendency to hypotension.² Our *gravid*, however, never had symptoms suggestive of this phenomenon like dizziness or sensation of faint.

ADR is the most serious medical complication encountered in patients with SCI, affecting up to 85% of patients with lesions at or above the T6 level (above the sympathetic outflow and above the upper level of greater splanchnic flow).¹² The signs and symptoms of ADR are due to exaggerated sympathetic activity in response to stimuli below the level of the spinal cord lesion. The most common sign is systemic hypertension, which is variable in severity, but could be severe. Other signs and symptoms are presented in [table 1](#).^{2–13–15}

During labour, ADR can result in uteroplacental vasoconstriction, fetal hypoxaemia and fetal bradycardia. The acute onset of ADR in labour can be difficult to distinguish from pre-eclampsia. However, making the correct diagnosis and initiating appropriate therapy can be life saving. Delay in therapy can result in devastating complications such as hypertensive encephalopathy, cerebrovascular accidents, intraventricular haemorrhage, retinal haemorrhage, and death from either pre-eclampsia or ADR.² Fortunately in our case none of these situations occurred. Elective c-section was performed, and spinal anaesthesia and epidural analgesia were given. Before surgery a vaginal examination (a usual trigger for ADR) was performed which did not provoke any signs or symptoms, and there were no other such incidences during pregnancy. All other procedures such as bladder

Table 1 Signs and symptoms of autonomic dysreflexia^{2 13–15}

Signs	Hypertension, hyperthermia, piloerection ('goose bumps'), increased extremity spasticity, pupil dilation (symmetric or asymmetric), respiratory distress, loss of consciousness and convulsions
Symptoms	Minor Nausea, prickling sensation in the base of the skull, nasal congestion and tinnitus
	Major Pounding headache, blurry vision, profuse sweating, flushing of the face and body (above the level of the lesion), skin tingling, muscle twitching and feeling of apprehension or anxiety

catheterisation or waxing groins for surgery was performed under epidural anaesthesia in order to avoid stimuli of ADR. The post-partum period was unremarkable as well, with no symptoms or signs of ADR after removing epidural catheter.

Learning points

- ▶ A multidisciplinary team, ideally of obstetricians and anaesthetists is necessary for studying, managing and timely planning of these pregnancies and deliveries.
- ▶ In these patients special attention must be given to possible urinary tract infections, thrombotic events, anaemia and any stimuli which may trigger autonomic dysreflexia (ADR).
- ▶ Knowledge of the possibility of occurrence of ADR in these patients and possible treatments is essential in conducting pregnancy surveillance and labour.
- ▶ In spite of a vaginal birth being generally indicated, we found it important to attend the patient's concern of not feeling labour contractions and performed an elective caesarean section.

Competing interests None.

Patient consent Obtained.

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