

CASE REPORT

# Spinal Cord Stimulation in the First Two Trimesters of Pregnancy: Case Report and Review of the Literature

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## ABSTRACT

**Introduction.** Spinal cord stimulation (SCS) is an accepted cost-effective therapy for many chronic pain syndromes. Its effects on pregnancy have not been studied because of stringent regulation and manufacturers' recommendations. However, childbearing women who had SCS become or choose to become pregnant despite these policies. It is paramount to monitor, document, and report these effects of SCS during pregnancy to build clinical experience and guide recommendations and management. **Methods.** We reviewed the literature for SCS in pregnancy and added new case report of a young woman who had SCS implanted for chronic pain, became pregnant and at the end of the second trimester the lead extender had to be divided to relief pain at the lead site. **Results.** We found only one previous case report in this field and we add another case. **Discussion.** Our case is different from the previously reported case in that the implantable pulse generator (IPG) of our case was implanted in the anterior abdominal wall, while the previously reported case was implanted in the subclavicular fossa. Therefore our case highlights the need to implant the IPG in a way that avoids stretching the lead extender by the expanding abdomen. **Conclusion.** SCS seems to be safe in the first two trimesters of pregnancy based on these two case reports and the abdominal wall should be avoided as a site for IPG implantation in these patients. However, more cases are required to establish the safety of SCS in pregnancy.

**KEY WORDS:** *Pain, pregnancy, spinal cord stimulation.*

## Introduction

Spinal cord stimulation (SCS) has been demonstrated to be effective treatment in failed back syndrome, complex regional pain syndrome (CRPS), refractory angina, and peripheral vascular disease (1–3). Almost all SCS devices consist of implantable pulse generator (IPG) or receiver, lead extender (LE), and an epidural lead (EL). The EL is anchored in the posterior paraspinal space to prevent its migration and connected to the LE which connects to the

IPG. SCS is not recommended in pregnancy because the effects of SCS on pregnancy and nursing mothers had not been studied. However, childbearing women who had SCS treatment might become or choose to become pregnant and it would be important to monitor, document, and report such patients to build enough clinical experience to advise these patients. We reviewed the literature and found one case of SCS during pregnancy and report another case.

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## Case Report

A 30-year-old woman had continuous SCS since 1998 for pain in her right chest wall. This pain had developed during an inpatient admission with pyrexia of unknown origin in 1996. The cause of the pain was thought to be most probably due to a viral illness that damaged the nerves supplying that area. This resulted in severe pain, which was refractory to all medical treatments. Her symptoms were then adequately controlled by epidural SCS in the high thoracic region. The EL was placed at T6 level with the IPG secured in a subcutaneous pocket (Fig. 1).

She became pregnant nine years after the implantation of SCS against medical advice. Her chronic pain continued to be troublesome and she used her SCS regularly during pregnancy to keep the pain under control. She had normal course of pregnancy with normal development of the fetus with the stimulation on. However, she developed new severe pain at the side of the abdomen at the junction between EL and LE. In the 25th week of gestation, the pain became intolerable (Fig. 1). The new acute pain was much worse than her usual chronic pain so the LE wire was surgically cut in the 28th week of gestation under local anesthesia and hypnosis. A small incision was made over the previous scar and the LE was located and sharply cut with the IPG switched off. The patient tolerated the procedure well and was discharged from the hospital after 24 hours' observation. An alternative option to deal with this specific issue was to extend the LE; however, we opted for the quickest and simplest way to resolve the problem. She went on to deliver a normal healthy baby at full term.

## Discussion

The safety and effects of SCS during pregnancy have not been established and pregnancy is a relative contraindica-



**FIGURE 1.** Photograph just before the LE (dotted line) was cut at point 2. Note the overstretched LE due to the anteriorly placed IPG (1).

tion according to the FDA and the manufacturers of these devices (4). Various meta-analysis and reviews on the effects of SCS have not included this group of patients (1–3). Safety of sacral neuromodulation and transcutaneous electrical nerve stimulation in pregnant women has been mentioned in case reports in the past (5).

Reviewing the English literature we found two case reports of SCS in pregnancy (6,7). The patient reported in the literature elected to have SCS in the cervical spine for CRPS to avoid the usage of potentially teratogenic painkillers. This patient had a full term safe vaginal delivery despite the stimulator being switched on throughout pregnancy, labor, and delivery. The disadvantages of using teratogenic analgesics also were overcome by SCS (6). A similar patient was reported having had SCS in the cervical spine 30 months before the pregnancy and had normal delivery under epidural anesthesia with no effects on the fetus or mother (7). Our patient was the first patient reported who became pregnant after successful SCS. Although there were no adverse events on pregnancy or the fetus in our patient, she developed mechanical acute pain at the junction of EL and LE because of the overstretched LE between its two fixed points: the IPG and LE junction. If her IPG was implanted in a location that was unlikely to be affected by the enlarged abdomen or if the LE was long enough she would have managed to continue her pregnancy without this pain. It also is important to note that the stimulated area was in the right thoracic wall and the uterus was not exposed to any SCS. It is, however, important to note that the vast majority of SCS sites are away from the abdominal wall and pelvis and our findings are applicable to most patients.

With increasing use of SCS for various pain syndromes, patients' wishes for future pregnancy had to be seriously considered and stimulation planned accordingly. We suggest that the site of IPG placement in childbearing women be placed posterior in the flank area away from the belt line or in the buttock area to avoid this complication. If however, a patient developed similar complication to that of our patient, simple division of the LE distal to the junction will resolve the problem.

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## Conflict of Interest

None.

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