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Pregnancy and delivery in patients with spinal cord injury

Ciąża i poród u pacjentek po uszkodzeniu rdzenia kręgowego

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S u m m a r y

Pregnancy after SCI (spinal cord injury) is not contraindicated. However, it exacerbates most problems associated with SCI by increasing the risk of thromboembolic complications, urinary conditions (urinary incontinence, infections) as well as respiratory symptoms and decubitus ulcers. Furthermore, pregnant SCI women are at higher risk of life-threatening autonomic dysreflexia (AD) compared to before pregnancy. Also, natural delivery is not contraindicated in SCI patients, however, early epidural anaesthesia as well as appropriate monitoring during labour are needed (females with injury below the level of Th10 do not feel contractions and are at risk of autonomic dysreflexia). Antenatal management in a patient with spinal cord injury requires extensive knowledge and experience. Breastfeeding is normal after delivery, however in women with complete SCI above T4 breastfeeding is delayed and additional stimulation is required (nasal oxytocin or visual stimulation). Minority of patients with SCI breastfeed (about 11%). Fertility is not affected in women with SCI. Contraception after delivery is recommended. Combined oral contraception containing estrogen is contraindicated. Progestogen only pills, progestogen injection, implants are more appropriate in this group of patients.

S t r e s z c z e n i e

Ciąża u pacjentek po uszkodzeniu rdzenia kręgowego nie jest przeciwwskazana. Nasila jednak problemy zdrowotne charakterystyczne dla tej grupy pacjentek: zwiększa ryzyko powikłań zakrzepowo-zatorowych, często w trakcie jej trwania pojawiają się problemy z układem moczowym (nietrzymanie moczu, zakażenia), nasilają się problemy z oddychaniem oraz odleżyny. Częściej również niż przed ciążą kobieta z uszkodzeniem rdzenia narażona jest na zagrażające życiu autonomiczne dysrefleksje (AD). Również poród siłami natury nie jest przeciwwskazany, wymaga jednak wczesnego założenia znieczulenia zewnątrzoponowego i właściwego monitorowania porodu (kobiety z uszkodzeniem poniżej Th10 nie odczuwają skurczów, narażone też są na autonomiczne dysrefleksje). Prowadzenie ciąży i porodu u pacjentki z uszkodzeniem rdzenia wymaga dużej wiedzy i doświadczenia. Karmienie piersią po porodzie przebiega zazwyczaj prawidłowo. Tylko u pacjentek z całkowitym uszkodzeniem rdzenia powyżej T4 obserwujemy opóźnienie laktacji. Wskazana jest wtedy dodatkowa wizualna stymulacja albo donosowa oksytocyna. Tylko 11% kobiet z uszkodzeniem rdzenia karmi po porodzie. Płodność kobiet po URK jest prawidłowa. Wskazane jest zatem zastosownie właściwej antykoncepcji. Doustne hormonalne tabletki antykoncepcyjne są przeciwskazane w tej grupie pacjentek. Rekomenowane są minitabletki gestagenne, implanty gestagenne i iniekcje z progestagenem.

Conflict of interest
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"People with disabilities are not a race that should live in isolation. This is not a group of people whose simple diagnosis of disability renders them abnormal or worthless. We could be disabled if a disaster had happened yesterday..., or if it happens tomorrow..."

Hamilton, 1978

INTRODUCTION

"Becoming a parent has significantly improved the quality of my life" – this answer was provided by 96% of respondents with SCI who have given birth (1). Approximately 10,000 new SCI cases are reported in the USA each year. This is an average of 28 to 55 people per one million inhabitants (2). Currently, there are over 40,000 SCI patients in the UK. Most of them are young people of reproductive age, including 26% of women (3). The number of SCI women is growing each year. The most common SCI causes include car accidents (36-48%), violence (5-29%), falls from height (17-21%) and sport (7-16%) (2, 3).

REPRODUCTIVE HEALTH IN WOMEN WITH SCI

A study in 472 women with SCI showed that most of these patients reported the same gynaecological problems as the majority of population. SCI women with statistically more common urinary tract infections and vaginal fungal infections compared to non-SCI women are an exception. Some of SCI patients develop secondary amenorrhea, which resolves spontaneously within 3 to 6 months in more than 50% of women. SCI patients are much less likely to undergo routine mammography. A total of 87% of patients reported having sexual intercourse prior to SCI, whereas the rate was 67% after injury. Autonomic dysreflexia (AD) and urinary incontinence are the most common problems preventing sexual intercourse. The percentage of women who experienced orgasm before injury, i.e. 79.1%, decreased significantly after the injury (37.3%). In the USA, 70.3% of SCI women use contraception (4). Kalpakijan et al. specified a relationship between menopause and its signs in SCI and non-SCI women (5). The study showed no significant differences in the age of onset of menopause between the groups. However, somatic symptoms, such as urinary bladder infections and decreased libido, were statistically significantly more common in SCI patients. Vasomotor symptoms and vaginal dryness were much more commonly reported by non-SCI patients. SCI women who do not undergo regular gynaecological examinations report difficulty using gynaecological chair, difficulty finding an appropriate doctor or problems with transport as the reasons (2, 4).

The author of this article performed an assessment of patients with physical disability who participated in a questionnaire. The study included 22 physically disabled women aged between 21 and 43 years. Higher education was declared by 7, secondary education by 11 and primary education by 4 respondents. Spinal cord injury was reported by 12 women (complete injury by 4 and partial injury by 8 patients), 4 women had cerebral palsy, myelomeningocele was reported by 5 patients and arthrogryposis by 1 woman. One of the SCI patients became pregnant. Seventeen SCI respondents had their first gynaecological visit between the ages of 17 and 27 years, including 10 women who attended a gynaecologist only once in their life. Regular menstrual cycles were reported by 18 respondents. Sporadic dysmenorrhoea was reported by 9 respondents, and regular dysmenorrhoea by 9 patients. Five respondents had never used contraception; previous or current use of contraception was declard by 16 patients. Condom was the most popular method of birth control. Only three respondents used oral contraceptives. Five patients were virgins. Ten respondents had regular sexual intercourse, with the classic position being the most common choice. Nine patients had a permanent life partner, while 5 respondents had never had one. Urinary incontinence and reduced genital sensitivity were the most commonly reported problems in sexually active patients. Nine women experienced typical discomfort during speculum insertion. Thirteen respondents had never had a smear test. All patients had normally developed internal and external genitals. Gynaecological examination revealed vaginal inflammation in 4 patients; anti-inflammatory treatment was implemented. Ultrasound revealed cysts with a diameter of more than 3 cm in two patients. Polycystic ovaries were detected in one patient. All smear test results were normal. During the program, one of SCI patients became pregnant and stayed under the care of the university outpatient clinic. Among the remaining 21 respondents, only two women had previously been pregnant. One of respondents had three childbirths by vaginal delivery; the other patient underwent a caesarean section (6).

PREGNANCY AND SPINAL CORD INJURY

Spinal cord injury is not a contraindication for pregnancy. However, patients should be appropriately educated and the pregnancy should be thoroughly planned once physical and emotional rehabilitation is completed. Jackson and Wadley showed that approximately 14% of women had at least one conception after spinal cord injury. Furthermore, no increase in stillbirth rates or congenital malformations in the foetus were observed in these patients (4). However, prenatal management should be implemented with proper care and knowledge on the measures to be taken in the case of potential complications. Guidelines for antenatal care, delivery and postpartum care in patients with SCI presented in this paper are based on literature data and author's own experience (7-10).

ANTENATAL CARE IN SCI PATIENTS

The general care of pregnant SCI patients should be conducted in accordance with the recommendations of the Polish Gynaecological Society. Pregnancy-related problems typical for this group of patients should be treated individually and taken into consideration in the course of pregnancy. The most common complications in pregnant SCI patients are shown in table 1 (7-10).

Tab. 1. The most common complications in pregnant SCI patients

Autonomic dysreflexia
Cardiovascular: – bradycardia – hypotension
Urinary: – infections – increased risk of stones in the urinary tract – urinary incontinence
Gastrointestinal: – constipation
Respiratory: – hypoxaemia – increased retention of respiratory secretions – increased susceptibility to pneumonia
Skin: – decubitus ulcers
Osteoporosis
Anaemia
Increased risk of thromboembolism
Thermoregulation: – injury above the level of T6 – lack of perspiration

AUTONOMIC DYSREFLEXIA (AD)

Autonomic dysreflexia described in SCI patients is a direct life-threatening condition. It occurs particularly in women with spinal injury at the level of Th6 and above. It was also observed that AD is much more common in patients with complete spinal cord injury (91%) compared to women with partial injury (27%), and occurs mainly in patients with chronic SCI rather than those injured several days or weeks earlier (11). Autonomic dysreflexia is caused by the disconnection of spinal sympathetic centres from supraspinal control as well as an impaired negative feedback loop. Adverse stimuli below the level of injury cause an excessive uncontrolled activation of the sympathetic nervous system, resulting in a sudden rise in blood pressure, bradycardia, irritability, a severe headache, flushing of the face and blurred vision. Untreated autonomic dysreflexia can lead to cerebral haemorrhage, renal insufficiency, seizures and death (12, 13). The causes of AD are listed in table 2 (7, 8, 11-13). The fact that AD can occur during gynaecological examination or labour is important from a gynaecological and obstetric point of view. Factors triggering AD can be limited by the use of a warm vaginal speculum, adjustment of the backrest angle to 45°, a continuous monitoring of blood pressure and performing gynaecological examination in a patient with an empty bladder.

Tab. 2. Causes of autonomic dysreflexia in SCI patients

Urinary: – catheterization, bladder inflammation, excessive filling of the bladder, urinary tract surgeries
Reproductive: – sexual intercourse, menstruation, pregnancy, labour, vaginitis
Gastrointestinal: – active haemorrhoids, appendicitis, gallstones, gastric ulcer, constipation
Skin: – burns, sunburns, frostbites, ingrown nails, decubitus ulcers
Other: – deep vein thrombosis, excessive consumption of alcohol and coffee, pulmonary embolism, injury

URINARY TRACT COMPLICATIONS

Asymptomatic bacteriuria is a very common condition in SCI patients. Urinary tract symptoms during pregnancy are reported by 45.5% of SCI patients compared to 8.2% of healthy females. According to the majority opinion, treatment in this patient population should not be initiated until pyuria or signs of pyelonephritis occur. Prophylactic nitrofurantoin administered from the second trimester of pregnancy is recommended in some centres. The management in pregnant SCI women with urinary tract infections (UTI) is based in most canters on physician's experience due to the lack of specific recommendations on this issue. This frequently results in unnecessary treatment and promoting antibiotic-resistant strains. Furthermore, increased symptoms of over-reactive bladder, urinary incontinence and post-void retention also occur in SCI patients during pregnancy. Pregnancy often requires self-catheterisation (as required), permanent or suprapubic catheter implantation (self-catheterisation training is usually sufficient, as confirmed by author's own observations) (6-8). An interesting meta-analysis intriguingly titled "Mission impossible? Urological management of patients with spinal cord injury during pregnancy" on urinary tract infections in pregnant SCI patients was published by Pannek et al. The author analysed 13 retrospective studies including 34.7% of women with permanent catheter, 25% of self-catheterising patients, 11.5% of patients performing the Credé manoeuvre and 28.8% of patients with spontaneous urination. A total of 64% of patients developed at least one symptomatic infection during pregnancy. The rate of infections was higher in females with permanent catheter (100%) compared to self-catheterising patients (38.5%), patients performing the Credé manoeuvre (17%) or women with spontaneous urination (53.3%) (14). So far, no uniform management has been established for pregnant SCI patients with neurogenic lower urinary tract dysfunction (NLUTD), and the published studies are still sparse (15).

THROMBOEMBOLIC COMPLICATIONS

There are no clear recommendations on thromboprophylaxis in pregnant SCI patients. The increased embolic risk persists for up to 6 months after the injury to later return to baseline (17). According to author's own experience as well as the experience in other centres, thromboprophylaxis using low molecular weight heparins can be safely used from the onset of pregnancy, e.g. as in line with RCOG recommendations (7, 8, 17).

RESPIRATORY AND CARDIOVASCULAR SYSTEM

Breathing difficulties exacerbate in SCI patients with increasing gestational age. Respiratory functions should be assessed in patients with spinal cord injury above the level of Th4. Respiratory gymnastics, CPAP and even mechanical ventilation are recommended. Heart rate and blood pressure should be monitored during gynaecological visit. It should be noted that the heart rate may be 40-50 bpm and blood pressure 80/50 mmHg in women with tetraplegia (7, 8).

DECUBITUS ULCERS

A thorough skin inspection is indicated during each visit. According to Jackson and Wadley, decubitus ulcers occur in 6% of pregnant SCI females. This is due to body weight gain, tissue oedema and immobilisation. The use of special mattresses and changing position every two hours are recommended to prevent bedsores (6-8, 19).

SPASTICITY

Jackson and Wadley showed that pregnancy increased spasticity in 12% of pregnant SCI patients. Severe spasticity often prevents physical examination and can be the first sign of labour in patients with spinal cord injury above the level of Th10, i.e. patients who do not feel contractions (7-9, 18).

PREGNANCY PATHOLOGIES

The incidence of spontaneous abortion in SCI patients is 14% compared to 6.5% in non-SCI patients. Previous studies also showed an increased rate of preterm births in SCI patients compared to non-SCI women (1, 6, 8). However, other studies failed to show such a relationship (18). It was also shown that transverse and breech positions are more common in SCI patients. The underlying mechanism is not fully understood. It has been suggested that a decreased tension of the abdominal muscles can be the cause (8).

CAESAREAN SECTION OR NATURAL BIRTH?

Patients with spinal cord injury below the level of Th10 feel uterine contractions. AD, hot flashes, increased spasticity or no symptoms are reported in patients with spinal cord injury above the level of Th10 as prodromal signs of delivery (tab. 3) (8, 19, 20). Previous studies suggested the need to hospitalise patients after 34 weeks of pregnancy. The current Danish observations indicate hospitalisation after 36.6 weeks with CTG monitoring of uterine activity performed 4 times a day. There are no absolute indications for pregnancy termination by caesarean section (8, 20). However, caesarean section as well as instrumental vaginal birth using vacuum extractor and forceps are statistically significantly more common among SCI patients. According to Westgren et al., caesarean section is performed in 47% of women with spinal cord injury above the level of Th5 and in 26% of patients with SCI below the level of Th5 (21). In the case of natural birth, early epidural analgesia and permanent bladder catheterisation are recommended to prevent AD (8, 19-21).

Tab. 3. Sensations in SCI women during labour

Injury below the level of T10: – regular uterine contractions
Injury above the level of T10: – pain above the site of injury – abnormal pain – rupture of the amniotic sac – increased spasticity – bladder spasticity – autonomic dysreflexia

BREASTFEEDING

Only 11% of SCI patients breastfeed compared to 28% of women who had given birth before spinal cord injury. In the case of complete spinal cord injury above the level of T4, lactation is delayed and requires intranasal stimulation with oxytocin spray. However, long-term breastfeeding can be also maintained in this group of patients (8, 22).

CONTRACEPTION IN SCI PATIENTS AFTER PREGNANCY

Recommended contraceptive methods for use in SCI patients include barrier methods, progestagen-based oral contraceptives and hormonal injections (Depo-Provera). The levonorgestrel intrauterine system and progestogen implants also seem a convenient contraceptive method. The choice of contraception should be based on the frequency of sexual intercourse, the level of spinal cord injury, the degree of dysfunction as well as other risk factors. In the case of mini-pill (progestogen-only pill – POP), patients should be informed that compliance increases efficacy and reduces the risk of vaginal spotting. The use of barrier methods, such as condoms, diaphragms and spermicides often requires higher motor ability from both, SCI women and their partners. He use of diaphragms, which are virtually unobtainable in Poland, involves an increased risk of urinary tract infections. In the case of women with impaired sensation, these infections are subjectively asymptomatic and thus can lead to serious kidney dysfunction. Depo-Provera contains high doses of progestogens and can increase both the risk of osteoporosis as well as body weight in this patient population. Intrauterine devices are not recommended in SCI women due to more frequent and heavier bleeding, inability to maintain proper hygiene as well as problems with identifying inflammation and the absence of uterine perforation symptoms (impaired sensation). Combined oral contraceptive pill, which contains oestrogens, is also contraindicated as immobilisation increases the risk of thromboembolic complications (23).

Tab. 4. Guidelines for the management in pregnant SCI patients

Supplementation: – iron and calcium preparations
Thromboembolic prevention: – low molecular weight heparins
Prevention of urinary tract infections: – alternatively, nitrofurantoin 1 tablet daily from the second trimester
Prevention of respiratory impairment
Respiratory gymnastics
Prevention of decubitus ulcers: – changing position every 2 hours, special mattresses
Prevention of spasticity: – baclofen (as required) by intrathecal pump
Prevention of constipations: – diet: fibre and large amount of liquids – lactulose or glycerin suppositories – enemas (alternatively)

CONCLUSIONS

Pregnancy in SCI patients should be treated as a high-risk pregnancy. During pregnancy, particular attention should be paid to the risk of thromboembolic complications, urinary tract infections and respiratory impairment. However, basic knowledge on autonomic dysreflexia is of utmost importance (tab. 4). Ideally, special centres should be established for the management of pregnant SCI patients.

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