

Putative protective effects of cesarean section on pelvic floor disorders

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Summary

Pregnancy can affect the lower genitourinary tract through physiologic changes, or traumatic injury tissue stretching and tearing, besides neurologic and vascular compression and compromise, and muscle strain are inevitable during childbirth.

The levator ani complex of the pubococcygeus, puborectalis, and iliococcygeus muscles must allow passage of the fetus. The perineal body and external anal sphincter may become injured, with or without episiotomy, but sometimes as a necessary maneuver to allow passage of the fetal head or shoulders. The traumatic insults may lead to permanent damage on pelvic floor and subsequent urinary or anal incontinence.

The 30% of premenopausal women and 50% of postmenopausal women have suffered in their life time of someone pelvic floor disorder like anal or urinary incontinence or prolapsed [1]. Childbirth and pregnancy have been implicated as antecedents for all three disorders but is difficult to relate with causation because symptoms often occur remote from delivery.

Stress or urge incontinence before pregnancy or childbirth is rare, occurring in less than 1% of women [2]. Stress urinary incontinence during pregnancy is common, and affects up to 32% of primiparous women [3,4]. It is unclear from current literature whether changes are secondary to the method of childbirth or to the pregnancy itself.

In this article we aim to review the literature regarding the impact of pregnancy or childbirth on pelvic floor changes.

Urinary incontinence

Several studies have linked vaginal delivery to injury of the pudendal nerve that has been associated with stress urinary incontinence. Furthermore, the number of vaginal deliveries is thought to be correlated with severity of incontinence.

Some epidemiologic studies have been performed to elucidate better the link between route of delivery and the development of urinary incontinence.

One of the largest epidemiologic studies was the EPINCONT study, performed in Norway on 15,307 Norwegian women were surveyed about the presence and severity of any urinary incontinence [5].

The authors tried to examine if women who underwent vaginal delivery during their lifetime had a higher rate of urinary incontinence than those who delivered by cesarean section. The authors found that overall, 10.1% of nulliparous women complained of urinary incontinence, 15.9% of women who delivered by cesarean section, and 21% who had only vaginal deliveries. When the authors stratified urinary incontinence by age groups, the apparent protective effect of cesarean section attenuated with increasing age. By the age of 50, urinary incontinence was seen in 28.6% of women with previous cesareans compared with 30% of women with previous vaginal delivers with similar rates of moderate to severe incontinence (14.3% versus 14.2%, respectively).

Another short-term prospective studies have confirmed the association between the development of stress urinary incontinence and vaginal delivery.

A prospective cohort study of 344 primiparous Dutch women with singleton pregnancies beginning in their second trimester was conducted by Van Brummen and colleagues[6]. The women were evaluated for urinary tract symptoms at multiple time points during their pregnancy and one year after delivery.

The study demonstrated that stress incontinence was more prevalent in women who had a vaginal delivery; in fact 33.9% of women delivering vaginally (compared with only 7.5% of those delivered by cesarean) complained of stress incontinence. At one year after delivery, the numbers had increased to 40.5% and 21.7%, respectively, for each group.

In opposite, the CAPS trial performed by the Pelvic Floor Disorders Network in 2006 found no statistical difference in rates of stress urinary incontinence [7]. The study enclosed 921 women from 11 sites across the United States and evaluated rates of stress incontinence through validated surveys at 6 weeks and 6 months postpartum. Urinary incontinence at 6 months postpartum was found to be 31.3% in women delivering vaginally and 22.9% in those delivering by cesarean. When only stress incontinence was examined, there was no difference between women delivering vaginally (14.4%) and those delivering by cesarean (14.3%).

In Sweden, Altman and colleagues [8], surveyed 395 women 10 years after their first vaginal or cesarean delivery to assess the development of urinary symptoms. Two hundred women with a mean age of 39.9 years delivered only by vaginal delivery, whereas 195 women with a mean age of 41.5 years delivered only by cesarean. Forty percent of women delivering vaginally compared with 28% of those delivering by cesarean reported stress urinary incontinence (odds ratio [OR] 3.1),

but these differences were largely caused by discrepancies reported by women complaining of mild symptoms (less than one episode per week); women complaining of more than one episode of stress incontinence weekly were found with similar frequency in each group.

A study was published in 2005 by Goldberg and colleagues [9] in which they had analyzed identical twin sisters. A total of 271 pairs completed validated surveys assessing symptoms of stress urinary incontinence. The authors also collected data on previous births and mode of delivery. They found that 67.1% of women with one or more vaginal deliveries reported stress incontinence compared with 47.7% of women who delivered only by cesarean and 24% of nulliparous women. The authors also found that the odds of stress incontinence increased because of parity from 2.3 for one birth to 4.3 for two or more births. Furthermore, they compared rates of stress incontinence and mode of delivery between 173 parous twin sisters. Within this cohort, women who delivered vaginally were more than twice as likely (OR 2.3) as women who delivered by cesarean to report stress incontinence.

Handa and colleagues [10] surveyed 1293 Maryland women undergoing elective hysterectomies. They found that 36% of all those surveyed reported stress incontinence and 35% reported urge incontinence. When mode of delivery was examined, they found that 28.7% of women who had delivered exclusively by cesarean complained of stress incontinence compared with 39.1% of women with at least one vaginal delivery. Parous women who had delivered by cesarean only were 40% less likely to report stress incontinence than those who had delivered at least one child vaginally. Women with any combination of cesarean and vaginal deliveries were just as likely to report stress incontinence as those delivering only vaginally.

A study completed a 2-hour in-person interview of 3205 women in the Boston area was done by Connolly and colleagues [11] to assess association between number of pregnancies, mode of delivery, and subsequent urinary symptoms. The authors found that women having at least one vaginal delivery were significantly more likely to report moderate to severe urinary incontinence than those who had never been pregnant or who had delivered only by cesarean. The effect was most pronounced in women aged 30 to 39 years old. The effect of mode of delivery on urinary incontinence was nullified after the age of 40; with a mean age of 49.2 years, there was no difference in the odds of moderate to severe incontinence in women who delivered exclusively by cesarean compared with those who had never been pregnant.

Although several studies suggest a protective effect of elective cesarean delivery on the development of stress urinary incontinence, that such an approach does not eliminate risk for women.

Buchsbaum and colleagues [12] surveyed 149 nuns in Rochester, New York, to identify rates of stress incontinence in a cohort of nulliparous women (mean age was 68 years old) through questionnaires. They found that 29.7% reported symptoms consistent with stress incontinence, 24.3% complained of urge incontinence, and 35.1% of nuns reported

mixed incontinence symptoms, suggesting that obstetric history has minimal impact in older women and pelvic

floor trauma during childbirth may be negated later in life by age, menopause, and hypoestrogenism.

978 women, mean age 42.7 years, were surveyed in McKinnie and colleagues study [13] in relation to symptoms of urinary incontinence. 23% percent reported urinary incontinence independent by mode of delivery, but pregnancy itself conferred an increased risk of urinary incontinence when compared with those women who had never been pregnant (OR 2.5). The authors concluded that cesarean section was not protective against the development of urinary incontinence.

Groutz and colleagues [14] concluded that labor itself, not just delivery, may play an important role in the development of postpartum urinary incontinence, performed a prospective cohort study of 363 primiparous Israeli women. The authors valued symptoms of stress urinary incontinence one year after childbirth in women who delivered vaginally, women who underwent elective cesarean sections, and women who underwent cesarean delivery for obstructed labor. The prevalence of stress urinary incontinence was similar in women who had vaginal deliveries and women who underwent cesarean section for obstructed labor (10.3% and 12%, respectively), besides they found that only 3.4% of women who underwent planned cesarean section complained of stress urinary incontinence during that postpartum year performed

A systematic analysis was performed by Press and colleagues [15] to resume data on mode of delivery and its association with the development of postpartum urinary incontinence. In a review of all cross-sectional studies (follow-up periods ranging from 3 months to 4 years), the risk of developing stress incontinence was reduced from 16% with vaginal delivery to 10% with cesarean section, although there was only a minimal difference when only severe symptoms were considered. Following a review of published cohort studies, the rate of stress incontinence was 22% following vaginal delivery compared with 10% following cesarean section (6.6% in women delivering by elective cesarean section) resulting in a number needed to prevent of 10.

Fecal incontinence

Anal incontinence, or the loss of flatus, formed, or loose stool that is a social or hygienic problem, can occur secondary to pregnancy or childbirth [16].

Recent studies has suggested that occult defects in the external anal sphincter may also be sustained after what seems to be an otherwise uncomplicated vaginal delivery moreover, age plays a role in the development of anal incontinence.

One of this was performed by Zetterstrom and colleagues [17] that found that increasing maternal age at delivery is a risk factor for anal incontinence. A 30-year-old woman having a risk three times higher than that of a 20-year-old woman.

The CAPS study also looked at the relationship between anal sphincter tears and postpartum fecal incontinence. The authors surveyed 407 women with clinically recognized sphincter tears during vaginal delivery and compared rates of anal and fecal incontinence in women without recognized sphincter tears during vaginal deliv-

ery with those who delivered by cesarean section. Validated questionnaires were administered at 6 weeks and 6 months postpartum. Women with third and fourth degree perineal lacerations were 2.8 times more likely to report postpartum fecal incontinence than those delivering vaginally without a sphincter tear. At 6 weeks postpartum, 26.6% of women who had sustained a sphincter tear during delivery complained of fecal incontinence compared with 11.2% of women delivering vaginally without a sphincter laceration and 10.3% of women delivering by cesarean section. At 6 months postpartum, the rates fell to 17%, 8.2%, and 7.6%, respectively. The authors concluded that although women delivering by cesarean have lower rates of fecal incontinence 6 months postpartum, they were not immune to these types of pelvic floor dysfunction.

Fritel and colleagues [18] surveyed 2640 middle-aged French women. They found that the prevalence of fecal incontinence was 9.5% in this group where the mean age was 54.9 years old and there was no difference in rates of fecal incontinence between nulliparous (11.3%), primiparous (9%), and multiparous (10.4%) women. Furthermore, they found that the difference in rates of fecal incontinence following vaginal delivery (9.3%) and cesarean delivery (6.6%) was not statistically significant. The most common cause of anal incontinence in young women is anal sphincter injury at childbirth. With advancing age, like urinary incontinence, the affects of childbirth may be superseded by other risk factors, such as aging [19].

The survey by McKinnie and colleagues [20] also reported on rates of anal and fecal incontinence. The authors found no difference in fecal incontinence between women who delivered vaginally or by cesarean section. Similar to their findings for urinary incontinence, they found an increased risk of the development of fecal incontinence following pregnancy itself (OR 2.3).

Similarly, Goldberg and colleagues [21] concluded cesarean section was not protective against the development of fecal incontinence.

A systematic review of obstetric factors associated with the occurrence of symptoms of anal incontinence in the first year postpartum was performed in 2008 [22]. The review concluded that mode of delivery appeared to influence the occurrence of anal incontinence only when flatus was included in the definition. There were no statistical differences between the development of incontinence to solid or liquid stool in women undergoing vaginal delivery versus cesarean within the first year postpartum.

The systematic review confirmed an association of forceps and fecal incontinence, finding that forceps doubled the risk compared with non operative vaginal deliveries.

As with urinary incontinence, there are data to suggest that labor itself, and not just mode of delivery, is associated with the development of anal incontinence.

Fynes and colleagues [23] found that 29% of women who had a vaginal delivery had impaired terminal motor latency compared with 9% of women delivering by cesarean. Women delivered by cesarean late in labor, after 8 cm dilated, had prolonged motor latency and reduced levator muscle strength compared with those with cesareans performed in early labor.

They concluded that cesarean delivery performed after cervical dilation of 8 cm failed to protect the anal sphincter mechanism.

Sexual function

An adverse effect on short- and long-term sexual function has been theorized for the effect of vaginal delivery on pelvic floor muscles and nerves.

Nerve injury during vaginal delivery may lead to difficulty with sensation, arousal, or orgasm.

Most women resume sexual activity by 8 weeks postpartum, and nearly all have some sexual complaints [24].

The CAPS cohort was also queried in respect to sexual activity and sexual function at 6 months postpartum using validated questionnaires. Although women with deliveries complicated by anal sphincter lacerations were less likely to report sexual activity within the 6 months postpartum (88% versus 94%), there were no differences in sexual function scores [25]

Six months postpartum, 35% of primiparous women complain of decreased sexual sensation and 24% of decreased sexual satisfaction, compared with function before childbirth. In the same retrospective cohort, 22% also complained of dyspareunia [26]. Intercourse-related problems can persist 12 to 18 months following delivery [27], and are more common in women who underwent operative vaginal delivery [28].

Women who have episiotomies or spontaneous perineal lacerations complain of increased perineal pain [29], decreased sexual satisfaction postpartum, and delayed return of sexual activity, compared with women who give birth with an intact perineum [28,30]. Women with severe perineal lacerations of the anal sphincter are more likely to report dyspareunia than women with an intact perineum [26].

In opposite, Gungor and colleagues [31] have been performed to examine the effects of mode of delivery on sexual satisfaction in the postpartum year also found no difference in sexual satisfaction of males regardless of their partner's mode of delivery.

It is unclear whether or not cesarean delivery is protective of postpartum sexual complaints. Because cesarean delivery avoids genital tract trauma, it has often been assumed to protect sexual function postpartum [32]. Some investigators have found that increased reports of pain are limited to the immediate postpartum timeframe, with differences between cesarean and vaginal delivery groups resolving by 6 months postpartum [32]. Nearly all studies that have examined the effect of mode of delivery on postpartum sexual complaints conclude that sexual dysfunction is highest in women undergoing operative vaginal delivery with forceps or vacuum [33].

Summary

This review of published literature suggests that pregnancy itself is likely to lead to some degree of pelvic floor dysfunction regardless of mode of delivery although urinary and anal incontinence although may be increased following vaginal delivery.

Furthermore, the prevalence of urinary and anal incontinence equalizes at the approximate time of menopause. Most women do not develop urinary or fecal incontinence postpartum.

The duration of any protective effect afforded by a cesarean section on the pelvic floor may be variable de-

pending on the age of the woman at time of delivery. The rates of urinary and fecal incontinence increase following any pregnancy, and eventually equalize with increasing age despite mode of delivery.

Although cesarean sections are the most common they do not go without risk. The rates of abnormal placentation, bladder injury, and blood loss are positively correlated with the number of repeat cesareans performed.

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