PATHOPHYSIOLOGY OF POSTPARTUM PELVIC FLOOR AND PERINEAL LESIONS

The Mediterranean Incontinence and Pelvic Floor Society [MIPS]

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Strong Pelvic Floor After Childbirth?
Introduction

• **NORMAL** childbirth damages the pelvic floor especially when non-evidence based and potentially harmful obstetric practices are used during labor.

• Pelvic floor health has a WIDER definition than normal urinary and fecal control, integrity of pelvic organ support, absence of perineal pain and and sexual health that includes the drive towards safer and less traumatic childbirth.

• Therefore, this concept includes all childbirth-induced pelvic floor dysfunctions such as pelvic organ prolapse [POP], stress urinary incontinence [SUI] and obstetric fecal incontinence [FI] and must include chronic perineal pain.
Vaginal childbirth is probably the most important risk factor in the etiology of pelvic floor dysfunctions.

Not all women who deliver vaginally develop pelvic floor dysfunctions; Some are more likely to be at risk than others.

If such ‘at risk’ groups can be identified, then prevention might be possible.
Prevalence

• The relative risk of developing any pelvic floor weakness during pregnancy and puerperium is 10.8!

• The odds of levator muscle trauma increase by 10% for each year of delayed child bearing and is identified on postpartum imaging in 20-40% of primiparas.

• After the first vaginal birth, 52% of women have some degree of anterior vaginal wall prolapse, 2-26% develop SUI and 4-25% suffer from FI in the postpartum period.

• The prevalence of symptomatic POP and objective POP on examination is 14.6% 20 years, and 24% 12 years after childbirth, respectively, irrespective of parity.
PATHOGENESIS
I- Direct Injury

• Direct injury to the pelvic floor MUSCLES significantly contributes to weakness of supportive function and development of pelvic floor dysfunctions.

• Spontaneous perineal lacerations commonly occur at vaginal delivery particularly in primiparous women.

• Occult or recognized anal sphincter disruption is also possible with subsequent FI in 50% of cases.
PATHOGENESIS
II-Indirect injury

- Over the last two decades, neuro-physiological and experimental research has revealed that vaginal delivery damages the pelvic floor muscles through mechanisms UNRELATED to traumatic disruption.

- During the second stage of labor, the pudendal nerve is compressed by the fetal head against the ischial spines.

- This subjects the nerve to a 33% increased strain causing entrapment neuropathy and partial de-nervation of the striated pelvic floor muscles.
PATHOGENESIS
II-Indirect injury

• In labor simulation computer and animal models, the fetal head and biomechanical labor forces produce a 3-fold increase in stretch and compression to the pelvic floor muscles during labor.

• This leads to muscle injury because the muscular tissue elasticity threshold observed in normal parturition is low.

• Straining during vaginal delivery also causes traction injury to the pudendal nerve similar to chronic constipation.
PATHOGENESIS
II-Indirect injury

• Indirect neural and muscular injuries are increased when:
  a- Labor dystocia is not detected and treated promptly (prolonged second stage, large-size baby).
  b- Aggressive maneuvers are used to expedite delivery such as manual compression of the uterus, dilatation of the vagina and excessive traction by the forceps or ventouse.

• These obstetric interventions are still “endemic” in some parts of the world mainly in rural communities and remote geographical areas.
Episiotomy

- Episiotomy has been TRADITIONALLY performed by the obstetric providers to protect against direct trauma to the pelvic floor muscles during parturition.

- However, the value of this procedure is increasingly questioned by the urogynecologic community.

- There is associated postoperative morbidity of “routine” episiotomy in the absence of clearly-defined evidence for efficacy of preventing pelvic floor dysfunctions.
Episiotomy

• 4 years after the first delivery, there was NO difference in the prevalence of urinary incontinence, **perineal pain** or painful intercourse between restrictive versus routine **medio-lateral** episiotomy *(Fritel et al, BJOG 2008;115: 247-252)*.

• Logistic regression confirmed that a policy of routine episiotomy was associated with double the risk of anal incontinence compared to a restrictive policy (OR = 1.84, 95% CI: 1.05–3.22).
Episiotomy

- Episiotomy is PARADOXICALLY associated with decreased perineal muscle strength and performance during the postpartum period than spontaneous perineal lacerations because of greater tissue disruption.

- The optimum ratio between the length of episiotomy and the length of perineum as well the angle of medio-lateral episiotomy that can reliably predict minimal perineal damage is NOT known.

- *Episiotomy particularly the routine procedure is frequently performed in many countries!*
Vaginal Birth

• Although cesarean delivery reduces the risk of pelvic floor trauma, it is NOT entirely protective.

• Less pelvic floor damage occurs after elective but not necessarily emergency cesarean and the elective procedure may prevent against direct trauma to the pelvic floor but not the effects of pregnancy or indirect injuries.

• The debate is ONGOING as the evidence supporting this finding is mostly derived from small studies of heterogeneous cohorts with short-term follow up and different and / inconsistent definitions.
Elective Caesarean

Recent epidemiological evidence suggests that elective caesarean delivery may be considered for women:

a- At high risk of obstructed labour and instrumental delivery (short stature with an infant weighing >4000 g).

b- With severe POP before a first pregnancy.

However, until definitive evidence is available, individual management is recommended. The most recent systematic review (2013) concluded that the inadequate, conflicting or inconsistent evidence is not in favor of elective caesarean (Level D = No recommendation possible).
Elective Caesarean

• In one study about SUI; the NNT was 8-9. However, the NNT was only 2 in women with short stature and an infant weighing more than 4000 g.

• In another study about POP, 6.8 additional operative births or 8.9 spontaneous vaginal births relative to cesarean births would lead to one additional case of POP after 5 years.

• In a third study about FI, the NNT was very high (167).
Pelvic Floor Muscle Training

- There is strong contemporary evidence (Cochrane reviews) that pelvic floor muscle training [PFMT] during pregnancy or postnatal period can prevent SUI in late pregnancy or postpartum SUI and FI, respectively.

- There was a greater treatment effect following more intensive regimes.

- There are no specific studies of PFMT for prevention of POP but the results are expected to be similar.

- Efforts to improve compliance with PFMT are required because the long-term effects are disappointing.
Pregnancy

- There is high-quality data suggesting that pregnancy has a detrimental effect on pelvic floor support and that a *bona fide* effect of pregnancy CANNOT be excluded.

- The risk of SUI amongst women who had had elective cesarean was higher than that in nulliparous women representing a net effect of pregnancy itself *(EPINCONT)*.

- Repeated pregnancy will have a negative cumulative influence on the pelvic floor similar to other pregnancy-induced disorders like diabetes mellitus and hypertension.
Pathogenesis

- The exact mechanisms during gestation remain obscure but could be due to:

  a- Increased urine production.

  b- Degenerative changes in the autonomic innervation of the lower urinary tract.

  c- Mechanical pressure exerted by the gravid uterus.

  d- Elevated elastolytic activity with softening of the collagenous supports of the pelvic organs due to endogenous hormonal changes (progesterone, relaxin).

  e- Increased BMI.
Consequences: Increased Demand for Curative Urogynecology

• In view of the increased risk of POP, SUI, FI following pregnancy and childbirth in low resource and less developed countries, a growing demand for CURATIVE urogynecologic services is anticipated.

• The need may be EVEN higher than the reported prevalence since the majority of patients in the developing world do NOT seek health care.
Preventive Urogynecology?

• The most pragmatic and SHORT-TERM solution to restore the demand/supply equilibrium in these countries may be to reinforce the preventive perspective of our urogynecologic practice.

• The goal is to transcend across the novel and artificial subspecialty boundary in Obstetrics and Gynecology and pursue the time-honored public health idiom “prevention is better than cure”.
Recommendations

• Raise awareness amongst maternity care givers about childbirth-induced pelvic floor dysfunctions e.g. the categorical *prophylactic* benefits of *routine* PFMT during pregnancy and after delivery.

• Disseminate information about the safe and evidence-based practices in labor (WHO Reproductive Health Library: Pregnancy and Childbirth, Care during childbirth. (http://www.who.int/rhl).

• Highlight the potential and independent adverse consequences of pregnancy on pelvic floor support.
Recommendations

• Assume a greater responsibility in counseling about the risk of POP, SUI and FI after pregnancy and delivery to improve the health literacy of target pregnant population.

• ACTIVELY involve women to:
  1- Understand the mechanisms of pregnancy- and childbirth induced injuries.
  2- Self-manage their reproductive and birthing choices.
  3- Comply with prophylactic measures.
Future Research

• Accurate and reliable identification of women at risk:
  a- Taking a detailed history in the antenatal clinic for pre-pregnancy POP, SUI and FI and other demographic risk factors.
  b- Ultrasound or MRI measurement of levator hiatus area during the third trimester.
  c- Genetic studies of collagen content, extracellular matrix proteins and genes involved in the function of muscular and connective support systems (Not possible during pregnancy by biopsy).
  d- Measurement of joint hypermobility and striae (Not very predictive).
  e- Asian or Black ethnicity.
  f- Measurement of perineal length or anal position index in labour.

• Studying the visco-elastic properties and deformation of pelvic floor supportive tissue at vaginal delivery:
  a- 3-dimension computational biomechanical (finite) element models.
  b- Animal (rat) models of vaginal birth.
Predictive Antenatal Models

**UR-CHOICE Hypothesis** (a scoring system for the evaluation of the most suitable route of delivery at 37-38 weeks of pregnancy for prevention of future PFD)

- **U**: presence or absence of antenatal urinary incontinence
- **R**: race/ethnicity
- **C**: childbearing started at what age
- **H**: height of the mother
- **O**: overweight (mother’s body mass index)
- **I**: inheritance (family history)
- **C**: children (number of children desired)
- **E**: estimated fetal weight
Conclusions

• Routine episiotomy is OBSOLETE because it does NOT decrease the risk of direct trauma to pelvic floor muscles and increases the risk of chronic perineal pain.

• Pregnancy may be an independent risk factor for developing childbirth-related pelvic floor dysfunctions.

• PFMT during pregnancy or postnatal period can prevent SUI in late pregnancy or postpartum SUI and FI.

• The Urogynecologist is the PERFECT women health care provider to lead public health efforts for reducing the burden and impact of childbirth and pregnancy-related POP, SUI and FI.
Conclusions

• Identification and referral of women at risk of childbirth-induced pelvic floor dysfunctions for supervised antenatal or postnatal interventions can minimize the consequences of pelvic floor trauma.

• Most interventions are non-invasive and might help reduce the risk of post-partum pelvic floor dysfunctions and the subsequent impairment in quality of life.

• The potential BUT NOT YET PROVEN benefits of cesarean delivery for prevention of pelvic floor damage must be weighed against the potential morbidity for the mother and child.
Key Messages

• The first vaginal delivery, especially at old age, is the time for the most significant pelvic floor damage.

• There is new evidence about risk groups for obstetric pelvic floor trauma that could be identified as part of routine antenatal care and prevention might be possible.

• A woman’s programmed biological age or reproductive function/span cannot be reversed but medical science can substantially contribute to research on prevention of female pelvic floor dysfunctions.
The complete protection of the perineum has undoubtedly remained a weak spot in our art.

*Ferdinand AMF von Ritgen, 1855.*

German obstetrician (1787-1867) who described the *Ritgen maneuver*: Delivery of a child’s head by pressure on the perineum while controlling the speed of delivery by pressure with the other hand on the head.
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