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UNSTRUCTURED ABSTRACT: 137 words

Obstetric anal sphincter injury (OASI) is strongly associated with a major negative impact on women’s health. Due to the consequences of an undiagnosed and therefore unrepaired OASI, it is essential to prevent or at least diagnose OASI at childbirth. We need to promote training of professionals to improve OASI screening at childbirth. High-risk situations such as operative delivery must be identified and preventive strategies such as the choice of a less traumatic instrument (vacuum) and mediolateral episiotomy should be considered. For a woman with OASI and/or symptoms, postnatal consultation with a specialist on pelvic floor disorders is essential to correctly orient her toward an adequate care pathway and to eventually identify occult or underestimated OASI. More data are required on therapeutic approaches for symptomatic women, primarily including physical therapy, sacral neuromodulation, delayed sphincter repair and palliative devices.

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35 **INTRODUCTION**

36 Obstetric Anal Sphincter Injuries (OASI) are a group of severe perineal tears involving at least a superficial
37 rupture of the external anal sphincter (third degree) and at worst a complete rupture of both the external and
38 internal anal sphincters and an opening of the rectal mucosa (fourth degree) [1, 2]. Incidence of perineal trauma
39 is reported in the literature at 0.5% to 5%, with nulliparity and operative vaginal delivery being the most
40 important risk factors. This complication of childbirth may have a major impact on women's health with a risk of
41 anal incontinence, perineal pain, sexual dysfunction, and postnatal depression [3-5]. There is also an important
42 medico-legal impact insofar as it represents the fourth largest number of maternity claims in the United Kingdom
43 [6, 7]. A major issue is represented by "occult" OASI, meaning anal sphincter rupture that remains
44 undiagnosed/missed or underestimated during perineal assessment following a vaginal delivery. In this situation,
45 women are exposed to a high risk of pelvic floor disorders and without the help of a specialist, other
46 underreported symptoms and suboptimal postnatal management [2].

47 Following a case report illustrating suboptimal care of a complete external anal sphincter rupture, we will present
48 a narrative review of the ways for optimizing the detection and protect women from OASI, and how best to
49 inform them about the consequences and improve their management.

50

51 **A brief and too common CASE REPORT**

52 A 26-year-old woman delivered her first child, who weighed 3.060g, by an operative vaginal delivery using
53 vacuum and then forceps.

54 A superficial OASI (3a tear) was diagnosed and repaired with only one absorbable stitch. At postnatal
55 consultation (at 6 weeks), the woman reported anal incontinence, but the registrar considered it as usual after a
56 vaginal delivery. Two years later, during her second pregnancy she was referred to a urogynecologist: she
57 reported severe fecal incontinence (a 17/20 Wexner score with use of anal plugs) and the specialist found a
58 clinically evident complete rupture of the external anal sphincter. Given her negative recollection experience of
59 the first delivery, the woman requested and received elective cesarean section. Endoanal ultrasound found
60 complete rupture of the external anal sphincter by 45°. No significant improvement was achieved by

61 physiotherapy, and 8 months after the cesarean section delayed external anal sphincter repair was carried out
62 which improved the symptoms. Three months after surgery her anal leakage is limited to gas and liquid stool.
63 She no longer wears an anal shutter and has resumed her sports, social and professional activities.

64 **Can we improve diagnosis efficiency?**

65 Several guidelines recommend that the perineum should be examined immediately after a vaginal delivery to
66 look for OASI occurrence [1, 2, 8]. The point that needs improvement is the training of obstetricians and
67 midwives to perform this screening correctly and effectively diagnose OASI. There are several data reports
68 showing that the rate of OASI diagnosis increased after specific training [9, 10]. The United Kingdom
69 implements a Care Bundle to improve OASI prevention and sensitize practitioners to the importance of training
70 for improvement of their diagnosis performance [7, 11]. The other way of improving OASI diagnosis that
71 deserves our attention consists of ultrasound scan in the labor room. In a randomized controlled trial (Endoanal
72 ultrasound versus no Endoanal ultrasound at delivery) the ultrasound group reported reduced anal incontinence
73 at 3 months (3.3 versus 8.7%) and one year after the delivery (3.3 versus 6.7%) [12]. Despite these encouraging
74 results, it would seem difficult to generalize Endoanal scans in all labor rooms. However, it appears legitimate,
75 in a very high-risk situation such as the one we have described, to propose ultrasound screening for OASI or a
76 second opinion/examination by a specialist in pelvic floor disorders. It appears essential in this context to
77 emphasize the importance of training in perineal examination for all birth professionals.

78 **Can we prevent OASI occurrence in high-risk situations such as operative vaginal delivery?**

79 *The prevalence of OASI in cases of non-instrumental delivery is lower to date, but perhaps under-diagnosed.*
80 Even when considering this limitation, compared to spontaneous vaginal delivery, operative vaginal delivery is
81 the most important risk factor for OASI occurrence [1, 2, 13-16]. Considering this, it appears intuitive that most
82 missed or underestimated OASI cases would occur in this situation. In this context, one major challenge is to
83 promote strategies for reducing this risk and preventing OASI occurrence. With this in mind, choice of
84 instrument and mediolateral episiotomy may have a substantial impact.

85 *The role of the instrument*

86 There is abundant literature suggesting that compared to vacuum delivery, operative vaginal delivery using
87 forceps is associated with a higher risk of OASI occurrence [1, 8, 13, 14, 17]. One explanatory hypothesis is that
88 a forceps placed on the fetal head increases the fetal cephalic perimeter, particularly its transverse diameter,

89 thereby inducing major stress on the perineum [17]. One limitation to this interpretation is that for most of
90 research teams reporting a higher morbidity in case of forceps, the vacuum has become the first-line instrument,
91 while the forceps is restricted to the most difficult cases [1, 8, 13, 14, 17].

92 This may reflect an indication bias, which may be associated with overestimation of the negative impact of the
93 forceps. Considering the data of the literature and these possible limitations, several guidelines indicate that
94 obstetricians should be aware that the use of the forceps appears associated with increased maternal morbidity,
95 and that should be considered in the choice of instrument for operative vaginal delivery [1, 2, 13]. French
96 guidelines indicate that when all instruments can be used, it is preferentially recommended to use a vacuum to
97 protect a woman's perineum [1].

98 *The role of mediolateral episiotomy*

99 Findings with a high level of evidence show that in spontaneous vaginal delivery, mediolateral episiotomy is not
100 protective of OASI occurrence [1, 2, 8, 18] and in cases of operative delivery, its role in OASI prevention is
101 highly debatable [15]. That said, most of the literature reports an apparently protective effect of mediolateral
102 episiotomy, especially in the event of forceps-assisted delivery [15, 17, 19]. However, many of the studies have
103 only a low or moderate level of evidence, which is why none of the existing guidelines are stronger than
104 "episiotomy should be considered" [1, 2, 8]. It is likely that in a high-risk situation such as the one reported here,
105 which involved sequential instrumentation in a nulliparous woman, mediolateral episiotomy would have been
106 protective. A large-scale French prospective one-year study including 15000 nulliparous women in 129
107 maternities will begin in 2021 and investigate the effect of episiotomy during operative vaginal delivery in
108 nulliparous women using a propensity score (INSTRUMODA study; <https://clinicaltrials.gov>; NCT 04446780).
109 It is expected that this study will yield appropriate antenatal information about episiotomy during operative
110 delivery and provide practitioners with usable data.

111 Another point of importance is the modality of the episiotomy. Indeed, it is widely reported in international
112 literature and guidelines that when an episiotomy is performed it is recommended to use a mediolateral one with
113 a 60° angle section [1, 2, 8]. It is likely that in case of midline episiotomy and/or in case of episiotomy with a
114 cutting angle getting closer to the midline there is a risk of extension into the anal sphincter. One problematic is
115 that there is discordance between the subjective perception of the cutting angle and the effective angle into the
116 perineum [20]. The importance of a correct cutting angle is also supported by data reporting that the risk of
117 OASI appears reduced in case of episiotomy performed using Episcissors-60 [21].

118 **Can we detect missed or underestimated diagnosis at postnatal visit?**

119 The importance of accurate OASI's diagnosis in the labor room is underlined by the fact that women will
120 subsequently be referred to a specialist in postnatal pelvic floor disorders. Without this diagnosis, the postnatal
121 visit will be addressed by a non-specialist practitioner who may not know how to effectively manage these
122 situations. This is highlighted in our case report, with a postnatal consultation having been performed by a
123 registrar who considered anal incontinence as usual in postpartum, even though it should be considered as a
124 warning sign in the event of OASI. It is likely that a more specialized practitioner would have more deeply
125 assessed anal incontinence symptoms, screened for pelvic floor disorders other than anal incontinence,
126 performed a focused physical examination and probably examined the woman using anal sphincter ultrasound
127 and anorectal manometry [4]. Pelvic floor disorders and anal incontinence are under-reported and under-
128 screened symptoms due to their social representation and context within which a mother is supposed to be happy
129 after her delivery about having giving birth to her baby. Specific consultations for women having undergone
130 OASI during their delivery appear useful as a means of providing them with adequate screening for symptoms
131 and of orienting toward an appropriate care pathway [4]. A specialist is likely to suspect an OASI in the event of
132 abnormal symptoms or related physical signs (short perineal body, absence of sphincter contraction, etc....).
133 Targeted consultation after OASI is recommended by the RCOG (Royal college of Obstetricians and
134 Gynaecologists) [2].

135 **How can we manage a subsequent pregnancy and discuss the future mode of delivery?**

136 The issue of a second or third delivery after OASI of major importance, especially insofar as it is frequently a
137 source of anxiety for women. It has been repeatedly reported that women who having had OASI for their first
138 delivery have an increased risk of OASI in subsequent deliveries [16, 22]. Available literature about the risk of
139 anal incontinence in case of vaginal delivery after OASI in the population of third-degree OASI and
140 asymptomatic women is mainly reassuring. A recent randomized trial comparing planned cesarean section and
141 intention to choose vaginal delivery in this situation did not report any benefit for the former [23]. Moreover, in
142 this situation the existing guidelines do not recommend cesarean section for asymptomatic women as a means of
143 preventing anal incontinence [1, 2]. With symptomatic women, on the other hand, discussion is much more
144 difficult and the sole recommendation that should be issued is to provide individual counselling to these women
145 regarding the risks of recurrent OASI and anal incontinence, as well as the morbidity associated with planned
146 cesarean section. While there are no data reporting a benefit for systematic ultrasound assessment of anal

147 sphincter and anorectal manometry, these examinations are often useful as a means of providing pregnant
148 women with objective data. **With this in mind, the RCOG guidelines are favorable to the use of ultrasound in**
149 **women with an history of OASI for discussing the mode of subsequent delivery [2]. As a counter-argument anal**
150 **incontinence is a multifactorial outcome which is not only associated with anal sphincter rupture [23]. In the**
151 **EPIC randomized controlled trial, it was not observed a protective effect of cesarean section on anal**
152 **incontinence in the subgroup with severe anal sphincter ruptures [23]. This considered, making the decision of**
153 **the mode of delivery based on ultrasound considerations for predicting anal incontinence might be inadequate.**
154 Symptomatic women should be counselled regarding the option of elective cesarean section after having been
155 given clear and individualized information on the different modes of delivery that they may choose [2]. In this
156 case report, given the experience of her first childbirth, the severity of her symptoms and her desire for elective
157 cesarean section, the latter was considered as a plausible option.

158 **Can we improve symptoms in women with symptomatic OASI?**

159 There exist no specific guidelines for the management of symptomatic women following OASI. **A first point is**
160 **that it is a major issue to offer women an adequate diagnosis of anal incontinence. Indeed, anal incontinence is a**
161 **symptom with an important negative social connotation, and which is shameful for most of patients. This**
162 **considered it is likely that the prevalence of anal incontinence might be underestimated due to a lack of report**
163 **[16, 24]. One possibility for optimizing the detection of anal incontinence is to use self-questionnaires that the**
164 **women can fill at home before her consultation. the most common questionnaires are the Wexner score, the**
165 **Pescatori score and the Pelvic floor distress inventory [16, 24]. These questionnaires also offer the possibility to**
166 **estimate the consequences of the symptoms in the women's quality of life which is, finally, the main outcome.**
167 One of the most frequent treatments for postnatal anal incontinence is physical therapy. A recent Cochrane meta-
168 analysis reported that data are not sufficient to draw conclusions about the potential benefit of physical therapy
169 and to recommend future clinical trials [25]. The most frequently employed techniques are manual physical
170 therapy and /or biofeedback without data permitting strong recommendation of one or the other [25]. Transit and
171 stool consistency are keys to management, especially in case of diarrhoea. Another option would be posterior
172 tibial nerve stimulation, particularly if associated urinary incontinence appears. Once again, however, high-level
173 evidence is lacking. While some studies have reported improved anal incontinence symptoms in women with
174 OASI, findings with a high level of evidence are insufficient to recommend its widespread use in routine clinical
175 practice [26]. In our experience, neuromodulation (posterior tibial or sacral nerve modulation) is considered as

176 an option for women with moderate but persistent symptoms and/or women without any improvement of their
177 symptoms after physical therapy.

178 Another option is to offer to propose delayed anal sphincter repair to highly symptomatic women with a
179 complete rupture of the external anal sphincter. We commonly weigh the interest of this option during the year
180 after OASI occurrence and in women clearly informed about the uncertain benefit and the potential
181 complications of this type of operation. Given the complete rupture of the external anal sphincter and the
182 massive impact of the symptoms on our patient's daily life, this option was considered in our case report. Lastly,
183 in the event of persistent symptoms following failed previous treatment, and/or if it is the woman's choice,
184 palliative solutions such as anal plugs or colostomy are possible alternatives.

185

186

187 **CONCLUSION**

188 The all-too-common situation of underdiagnosed OASI, which constitutes an instance of failure of care with
189 major and long-lasting repercussions, underlines the crucial importance of identifying high-risk situations for
190 OASI occurrence and the need for specialized training aimed at providing accurate diagnosis of OASI
191 immediately after childbirth. Postpartum management of OASI should also be improved by means of specific
192 postnatal consultation and individualized discussion about the modalities of subsequent delivery. Future studies
193 are required to specify the respective impacts of preventive strategies (episiotomy), alternative strategies for
194 diagnosis (ultrasound) and postnatal management of symptomatic women.

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