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Labor augmentation in an Egyptian teaching hospital

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Abstract

Objectives—The study documented facility-based obstetric practices for normal labor in Egypt for the first time, to determine their relationship to evidence-based medicine. This paper describes the labor augmentation pattern observed.

Methods—176 cases of normal labor were observed by medically-trained observers using a checklist. Ward activities were also documented. Observed women were interviewed postpartum and all findings were shared with the providers for their feedback.

Results—Labor was augmented in 91% (165) of the labors observed; this was inappropriate for 93% or 154 women. Reasons for inappropriateness were: oxytocin ordered at the first vaginal exam (41%); in spite of intact membranes (36%), at the time of membrane rupture (42%), in spite of good progress (24%), or a combination of these. The monitoring of oxytocin-receiving women and their babies was inadequate.

Conclusions—Labor augmentation and monitoring deviated from evidence-based guidelines. Obstacles to implementing protocols need to be explored.

Keywords

Oxytocin; Augmentation; Normal labor; Egypt

1. Introduction

In Egypt, 49% of births are facility-based and 69% are medically-assisted [1] yet the maternal mortality ratio, while improved, is 84 maternal deaths per 100 000 live births [2]. Half of these deaths occur during delivery or within the first 24 h. Substandard care by the obstetric team is the main avoidable factor contributing to maternal deaths, constituting 43% of the avoidable factors in the most recent survey [2]. The Egyptian government's programs addressing obstetric emergencies have contributed to a significant reduction in maternal deaths. However, little is known regarding the nature of facility practices for normal labor or provider adherence to standardized protocols. While several studies [3–7] have documented selected facility practices for normal labor, we could not find comprehensive documentation of facility-based normal labor practices in the literature. Providers' attitudes and women's preferences are similarly unexplored. The study upon which this paper is based documented

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all facility practices for normal labor through direct observations, avoiding biases inherent in interviews and record audits.

Because augmentation patterns are undocumented in Egyptian obstetric facilities, one objective was to determine the frequency and pattern of oxytocin augmentation. This paper presents the first assessment of facility-based augmentation in Egypt and explores factors affecting the practice. Other study findings are reported elsewhere [8].

Oxytocin stimulates uterine contractions and is widely used to shorten labor. Protocols restrict oxytocin augmentation to poor labor progress (cervical dilatation <1 cm/h), following membrane rupture [9]. Oxytocin is safe when used correctly. Complications usually follow improper doses or inadequate supervision [10]. Uterine hyperstimulation, a dose-related complication, can cause placental abruption, uterine rupture, uterine atony, uteroplacental hypoperfusion and fetal distress. Oxytocin is also associated with neonatal hyperbilirubinemia [11]. In the US, approximately 50% of all medical–legal settlements are for perinatal cases, of which 50% are oxytocin-related [12]. A WHO technical report [9] considers augmentation ‘a major intervention that should only be implemented on valid indication’ and questions whether ‘labor augmented by oxytocin should be considered normal’.

Approximately 15% of normal labors in the United States are augmented [13]. A facility study in three developing countries [14] documented augmentation levels for normal labor of 4–22%. We could not find data on the magnitude or pattern of oxytocin augmentation in Egyptian facilities or in other developing countries.

The study site is an influential obstetric facility delivering 20 000 women annually. It trains 225 doctors every year, who widely disseminate acquired obstetric practices. Importantly, the obstetric care offered and the challenges faced by staff are not unique to this facility or to Egypt, making the findings relevant to practitioners and policy-makers in similar circumstances.

2. Methods

A team of four obstetricians, a public health physician, an anthropologist, a neonatologist and a data manager designed and conducted the study in an obstetric teaching hospital in central Cairo. Women were included at arrival to the emergency room, if actively laboring with 3–6 cm cervical dilatation, with a single, vertex-presenting full-term fetus and with complication-free obstetric and past histories. After obtaining informed consent, labors and deliveries of 188 women were directly observed between October 10th–November 6th, 2001, by non-staff female obstetricians, observing one woman each, in 8-h consecutive shifts. A total of 176 women were observed for their entire labor and delivery, 12 were observed for portions of these, yielding 672 h of continuous observation over 28 consecutive days and nights. All interventions, interactions and neonatal care procedures were recorded on a 200-item checklist [15]. Augmentation, dosage and timing were documented in relation to labor progress, membranes status and maternal and fetal monitoring. General ward activities were documented and observed women were interviewed postpartum. Five days of observer training were followed by a 3-day pre-test. Data were analyzed using SPSS.

3. Results

Table 1 shows the proportion of augmented labors and the augmentation appropriateness. Oxytocin (5 i.u.) was the most frequently administered dose for labor augmentation (82%). Most augmentations were ordered by the resident (74%) or a more senior provider (22%). Sixty-five percent (108) of the augmented women were multiparas. Table 2 shows the

proportions of women examined by different providers and the monitoring of the oxytocin-receiving women and their fetuses. Table 3 shows the observed caseload.

4. Discussion

In the Arab region, facility-based normal labor practices have recently begun to be examined, by interviewing providers [5] and observing midwifery practices [4]. Elsewhere [3,6,7], selected labor practices have been documented by interviewing providers, observing practices, or both. However, we were unable to find comprehensive documentation and quantification of normal labor facility-based practices in general, and oxytocin augmentation in particular, using the direct observational approach described. While costly and logistically challenging, directly observing practices avoids interview biases. It also allows for documentation of procedures not retrievable from medical records such as provider hand-washing or verbal interactions.

Our documentation of practices rather than clinical outcomes was deliberate. Documenting processes; recording what is done to patients, where, when and how is helpful in identifying healthcare deficiencies [16]. When processes are supported by research-based evidence, their measurement helps assess quality of care. Outcomes of practices such as inappropriate labor augmentation are well-documented in the literature. Our study, therefore, recorded the hitherto undocumented frequency of practices rather than their clinical consequences.

At the time of the study, providers followed protocols for complicated labor and obstetric emergencies but not for normal labor. Partograms were not available. The hospital management is keen to implement evidence-based practices for normal labor and was very supportive of the study.

4.1. Magnitude of augmentation

Unexpectedly, oxytocin augmentation was near-universal. Most observed labors were augmented (91%, *N*= 165), usually by the resident in charge. Such frequent labor augmentation has significant implications on the macro level. Extrapolating a 91% augmentation level to all facility-based deliveries taking place in Egypt annually [1], makes it possible that approximately 400 000 labors are augmented, exposing 800 000 individuals annually—mothers and babies—to the drug. Whether this is actually the case is unknown.

4.2. Augmentation appropriateness

Augmentations were largely inconsistent with evidence-based augmentation criteria. The research team categorized oxytocin augmentation as inappropriate in most (93%, *N*= 154) augmented labors (Table 1). Protocols restrict augmentation to failure of progress (cervical dilatation <1 cm/h). However, 41% of the inappropriate augmentations were made at the time of the first vaginal exam, before progress was assessed (Table 1). Protocols stipulate membrane rupture prior to labor augmentation, to avoid rare but potentially fatal amniotic fluid emboli. However, augmentation was done in the presence of intact membranes for over one-third (36%) of the inappropriately augmented labors. Both spontaneous and artificial rupture of membranes (SROM and AROM), stimulate endogenous oxytocin and may accelerate labor without further intervention. However, oxytocin was ordered either at rupture or less than an hour from SROM/AROM, in almost half (42%) of the inappropriate augmentations. For these women, oxytocin was ordered when the membranes ruptured, at the time of the first vaginal exam (17%) or afterwards (25%) (Table 1).

Where uterine contractions result in good labor progress, augmentation is unnecessary and potentially harmful. Of the inappropriately augmented labors, almost one-quarter (24%) were augmented although labor was progressing well. Moreover, two contraindications were

simultaneously present in almost half (45%) of the inappropriately augmented labors (Table 2).

It is noteworthy that even persuasive advocates for selective active management of the first stage, such as O'Driscoll et al. [17], report augmentation rates of 40% and only in primiparas, while the majority (65%)of the women we observed whose labors were augmented were multiparas. Augmentation was not indicated in the 11 deliveries where it was not done, in the team's view.

4.3. Monitoring of augmented women

Bearing in mind that 'in countries with sophisticated facilities and high proportion of institutional births, labor augmented by oxytocin is considered high-risk' [9] and that 'the clinician (has) several options for oxytocin dosing, but a clear necessity for careful surveillance of mother and fetus' [18], and that women's responses to oxytocin vary, we documented monitoring of the oxytocin-receiving women. Firstly, oxytocin-containing infusions were labeled in only 70% of augmented labors, making provider identification of all oxytocin-receiving women and the dosage administered difficult. Secondly, augmented women's progress was poorly recorded. Of all vaginal exams performed by residents in charge for oxytocin-receiving women (N= 754), findings were recorded in one-third, making monitoring problematic since different providers conducted the serial vaginal examinations which occurred over time (Table 2). A lower incidence of recording of progress (22%) was observed for appropriate augmentations, revealing that women for whom oxytocin was indicated were nevertheless exposed to it in an inappropriate manner, as their responses were frequently unrecorded by attending providers and, therefore, poorly monitored in our view (Table 2). Lastly, guidelines stipulate relating oxytocin-containing infusion rates to uterine contractions [11], decreasing the rate when contractions are too frequent and increasing it when uterine activity slows. Gravity-fed infusions, used in our facility—as opposed to infusion pumps—require periodic adjustment to ensure a constant infusion rate. Our findings, showing poor monitoring of oxytocin-receiving women and their fetuses (irrespective of augmentation appropriateness) raise concerns. Few (36%)observed oxytocin infusions were checked at least once, making it doubtful that the infusion rate was adequately adjusted to contractions (Table 2).

4.4. Augmentation and fetal monitoring

A significant proportion of US perinatal medico-legal proceedings are related to oxytocin management in labor [12]. Prolonged uterine contractions reduce placental perfusion, resulting in fetal asphyxia with fetal heart deceleration. WHO [9] recommends electronic fetal monitoring with oxytocin administration. Concerning induction, if continuous fetal heart monitoring is impossible 'serious consideration should be given to abandoning the effort' [18]. In our study, fetal heart rates were intermittently monitored using a Pinard apparatus, at appropriate intervals (15–30 min) in 21% of the inappropriately augmented labors and in none of the appropriately augmented labors (Table 2). These levels of fetal monitoring, regardless of augmentation appropriateness, make identification of fetal distress difficult. The findings are worrying given Egypt's neonatal mortality level [1]. While under-five mortality, currently 54 deaths per 1000 births, has fallen significantly, babies are dying younger, with over 40% of early childhood deaths occurring in the first month [1]. The contribution of inappropriate obstetrical practices to neonatal mortality in Egypt is unknown and deserving of urgent study, particularly as early neonatal mortality (deaths occurring 0–6 days) comprised 67% of all neonatal deaths between 1995 and 2000 [1]. The contribution of oxytocin to perinatal morbidity and mortality in Egypt has been raised by concerned neonatologists (Hamed, M., personal communication, 2002) but is as yet unexplored.

4.5. Providers perspectives

The team explored reasons for observed practices by interviewing providers, who reported that high caseload, causing bed shortages, was the main reason for near-routine labor augmentation. The average observed number of women per bed per shift was four (Table 3). During data collection 100 women were admitted daily with a patient–provider ratio of 8:1. In addition to normal deliveries, cases included obstetric emergencies requiring multiple providers, skewing the patient–provider ratio. Cases were unequally distributed, overloading staff at peak times. Providers are also responsible for time-consuming teaching responsibilities. The absence of normal labor protocols at the facility, unfamiliarity of junior providers with factors contributing to maternal deaths in Egypt in general and with potential risks of oxytocin administration in particular, all contribute to the practices observed. However, habits acquired in high-caseload situations can be subsequently applied in settings with fewer manpower or resource constraints. The similar augmentation pattern observed in the free, high caseload department and the paying, low caseload department supports this hypothesis (Table 1).

Based on these findings, the hospital is at the time of writing instituting a normal labor protocol and exploring strategies to alleviate bed shortages.

5. Conclusions

Providers are working in challenging circumstances. However, the near-routine, inadequately monitored and largely inappropriate augmentation level documented is worrying given Egypt's improved but significant maternal and neonatal mortality levels. The findings illustrate 'an obstetric treatment which is safe in well-defined situations and which may have significant negative effects where the same technical quality of care cannot be guaranteed' [14]. The impact of inappropriate practices in teaching facilities extends beyond their catchment area, when obstetricians complete their training and practice elsewhere. While most augmentation complications can be potentially dealt with at this facility, this is unlikely in less well-equipped situations. Moreover, obstetricians are often emulated by less qualified providers. 'Sites of modern medicine frequently serve as principal sources of practices among peripheral health and paramedical workers' [19]. This is supported by research from Egypt [20] showing-according to women's reports—oxytocin administration by community-based midwives (*dayas*) and private practitioners in small facilities.

5.1. Recommendations

All providers should be aware of the potential risks associated with oxytocin and protocols for its administration should be followed stringently. Since providers view augmentation as a necessary coping mechanism, strategies to alleviate heavy caseloads and bed shortages should be instituted. Obstacles to adopting protocols for normal labor need to be explored.

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Table 1

Proportion of labors augmented and augmentation appropriateness

Proportion of labors augmented (%)	165/181 (91)
Free department	108/121 (89)
Paying department	57/60 (95)
Proportion of labors inappropriately augmented	154/165 (93)
Reason for inappropriateness (%)[a]	
Timing (at first vaginal exam)	63/154 (41)
Augmentation with intact membranes	56/154 (36)
Augmentation at membrane rupture	65/154 (42)
at first vaginal exam	27/154 (17)
after first vaginal exam	38/154 (25)
Augmentation despite good progress	37/154 (24)

[a] Forty-five percent had two reasons.

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Table 2

Monitoring of oxytocin-receiving women and their fetuses

	Labors augmented	Augmented appropriately	Augmented inappropriately
Number of different examining providers (%)			
1	15/163 (9)	–	15/152 (10)
2–3	91/163 (56)	4/11 [a]	87/152 (57)
4–5	39/163 (24)	5/11 [a]	34/152 (22)
>6	18/163 (11)	2/11 [a]	16/152 (11)
Monitoring of women and their fetuses (%)			
Infusion labeled[b]	96/138 (70)	6/9 [a]	90/129 (70)
Infusion checked once[b]	57/160 (36)	4/11 [a]	53/149 (36)
Woman's progress monitored:[b] (vaginal exam findings recorded, of all vaginal exams observed)	223/754 (30)	17/78 (22)	206/676 (30)
Fetal condition monitored[b] (Fetal heart heard appropriately)	32/162 (20)	0/11 [a]	32/162 (21)

[a] Percentages not shown.

[b] Every category has some missing women.

Table 3

Prelabor ward caseload observed

Shift	Number of patients	Maximum number of patients/ bed per shift	Number of empty beds	Beds serving three or more women per shift (%)
08.00–16.00	37	4	None	44
16.00–00.00	31	5	None	24
00.00–08.00	24	4	1	11

Average caseload = doctor:patient = 1:8.