Midwifery 62 (2018) 214–219

Contents lists available at ScienceDirect

Midwifery

journal homepage: www.elsevier.com/locate/midw

Administration of oxytocin during spontaneous labour: A national vignette-based study among midwives

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ARTICLE INFO

Keywords:
Oxytocin administration
Spontaneous labour
Midwives
Case-vignette

ABSTRACT

Objective: (1) to assess variations in oxytocin use by midwives during spontaneous labour (indication, dose, moment), and (2) to identify factors potentially associated with oxytocin administration.

Design: descriptive cross-sectional study using a case-vignette and questionnaire among French midwives from November 2015 to May 2016.

Methods: Midwives were asked to complete an online survey including a case-vignette with hourly partograms of a slowly progressing labour, and a short self-administered questionnaire. Two choices were proposed with each hourly partogram: administration of oxytocin or expectant management. Midwives who selected oxytocin were then asked about the dose, dose-increment and dose-increase delay. The questionnaire asked the midwives about work experience, day or night work, and organisational factors.

Findings: The study included 204 midwives. At some point during the case-vignette, 159 (77.9%) midwives responded that they would use oxytocin. Answers demonstrated variations in oxytocin administration for initial doses, dose-increments and dose-increase delays. Specifically, a substantial majority of respondents chose high doses of oxytocin (64.1% at doses exceeding 2 mIU/min) and short dose-increase delays (62.9% under 30 min). Excessive administration of oxytocin by midwives was significantly associated with the number of births per year in their maternity unit, midwives' workload ($p < 0.001$), overload of delivery rooms ($p < 0.001$) and lack of protocol (22% versus 55.6%, $p < 0.001$). Midwives considered that their use of oxytocin was related mainly to an overburdened department (48.5%).

Key conclusions and implications for practice: We observed overuse of oxytocin, influenced by organisational factors. Every maternity unit should implement a protocol and/or checklist for oxytocin administration to reduce variation in practice and improve safety of care by using evidence-based clinical indications, initial doses, dose-increments and dose-increase delays. Modifying the organisation of care appears necessary to reduce hospital patient volume or increase staffing to ensure that the number of midwives on duty matches the activity in the delivery room without causing excess work or stress to midwives.

Introduction

Exogenous oxytocin is widely used within maternity units to augment a woman's labour. This intervention to normal physiology is commonplace in many countries. The 2010 French perinatal survey reported that 58% of women with spontaneous labour received oxytocin during labour (Belghiti et al., 2013). In the United States, data from the Consortium for Safe Labour for 2002–2008 showed that synthetic oxytocin for augmentation was used for 45% of women (Zhang et al., 2010).

Exogenous oxytocin has been used for augmentation of slow but progressing labour (associated with amniotomy) since the early 20th century. In O'Driscoll et al. (1973) recommended augmentation of labour to decrease the caesarean rate due to labour dystocia, then the leading indication for caesarean deliveries for nulliparous women. A 2013 Cochrane meta-analysis showed that early oxytocin is associated with a significant reduction—around two hours—in the mean duration of labour (Bugg et al., 2013), but does not reduce caesarean section rates. Further, it is associated with an increased rate of uterine hyperstimulation, causing fetal heart rate changes that necessitate intervention. Randomised controlled trials and meta-analyses have shown only a few maternal-fetal complications, notably uterine hyperactivity. Nonetheless, their objective has been to study the efficacy of oxytocin in different circumstances,

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https://doi.org/10.1016/j.midw.2018.04.017
Received 20 December 2017; Received in revised form 20 March 2018; Accepted 15 April 2018

and complications are not always selected as an outcome. Moreover, the number of individuals in these studies is frequently too small to demonstrate rare complications.

The recent proposal by Zhang et al. (2010) of new time norms for different phases of the first stage of labour are likely to influence the timing of oxytocin use. Around the same time, the Institute for Safe Medication Practices (ISMP, 2014) has added intravenous oxytocin to its list of potentially risky or "high-alert" drugs, noting that its administration has been associated with adverse maternal-fetal effects, including uterine hyperactivity (Heuser et al., 2013), neonatal acidosis (Jonsson et al., 2008) and postpartum haemorrhage (Belghiti et al., 2011; Loscul et al., 2016), as well as with serious adverse events in obstetric malpractice litigation (Simpson and Knox, 2009). Some studies have pointed to inappropriate or careless use of oxytocin during labour (Berglund et al., 2010; Jonsson et al., 2007), and some authors have raised the possibility that complications differ according to whether oxytocin is used for dystocia or is used routinely without dystocia (Bernitz et al., 2014; Kjaergaard et al., 2009). Thus Clark et al. (2009) described the "normalisation of deviance" as a factor contributing to oxytocin misuse and degrading professional or technical standards based on individual experience.

In France, about 14,800 midwives work in health facilities: university or non-university public maternity units or private maternity units (DRESS, 2015). In France midwives have a specific medical education certified by a state diploma, considered equivalent to a Master's degree, and midwifery is included in the Public Health Code as a medical profession along with doctors and dentists. Decrees from the Ministry of Higher Education and Research define the content of midwifery educational programmes, including "diagnose and monitor labour", and administration of oxytocin during insufficient uterine contractility. Until now the exact timing of administration depended on professional judgement (about 2–3 hours of stagnation of cervical dilatation). Midwives work closely with the obstetricians and anesthesiologists on duty. Midwives have autonomy of prescription and administration of oxytocin, but in private maternity units, they must follow the recommendations of obstetricians, who manage their own patients. Oxytocin use appears to be associated with the birth setting. It is more frequent in private maternity units than in university hospital centres (OR 2.2, 95% CI 1.8–2.7) and in maternity units with fewer than 1000 annual deliveries (OR 1.4, 95% CI 1.1–1.7) than in those with more than 4000 (Belhiti et al., 2013). In some countries, such as France, midwives are legally authorised to prescribe and administer oxytocin during spontaneous labour. A qualitative study has suggested that external factors, as overburdened departments (inadequate staffing levels relative to number of births), lack of experience, and night work might affect midwives' decisions to use oxytocin (Ekelin et al., 2015).

To improve the quality and safety of care, it is therefore essential to understand when, why and how midwives use oxytocin during spontaneous labour. The objective of our study was (1) to assess variations in midwives' use of oxytocin during spontaneous labour (indication, dose, timing), and (2) to identify factors potentially associated with oxytocin administration.

Clinical vignettes, which have been used and validated for the analysis of clinical practices (Peabody et al., 2000; Rousseau et al., 2015), were chosen to assess midwives' practice. Dynamic multistage vignettes with partograms reproduced the course of labour.

Material and methods

Design

This descriptive cross-sectional study took place from November 2015 to May 2016 among French midwives recruited by "snowballing" dissemination.

Survey instrument

Midwives were asked to complete an online survey including a case-vignette with hourly partograms of a slowly progressing labour, and a short self-administered questionnaire. Thus an hour was added to the partogram on each successive page

The vignette and its partogram described the spontaneous labour at 40 weeks of gestation of a 29-year-old primigravida, progressing but slowly during the active phase of labour, with epidural analgesia, after spontaneous rupture of the membranes. Uterine contractility, fetal heart rate, and cervical dilation are described hour by hour because French midwives routinely assess cervical dilatation hourly. Two choices were proposed with each hourly partogram: administration of oxytocin or expectant management. The partogram ended at the point that the midwife chose to administer oxytocin: going back was not possible (see Appendix 1). At that point, the next questions covered its use: the starting dose, the augmentation dose, and the minimum time before any increase.

The self-administered questionnaire asked midwives about:

- individual work-related information: their experience (years), day or night work;
- organisational factors related to the facility they worked at: number of delivery rooms, number of annual births, existence of a protocol about oxytocin administration in the delivery room, the maternity unit's level of neonatal care (level 1 had no facilities for nonroutine neonatal care, level 2 had a neonatal care unit, and level 3 were reference centres with an onsite neonatal intensive care unit), midwives' workloads (number of births per year in the maternity unit divided by the number of midwives working daily), and delivery room overload (number of annual births in the maternity unit divided by the number of delivery rooms);
- factors that they thought might influence their use of oxytocin daily. This was a multiple-choice question: "what factors may influence your use of oxytocin in a situation of slow progress in a spontaneous labour?": overburdened department, doctor's request, lack of experience, night work, the woman's request, other factors (free response) or none. The first four responses were based on previous qualitative results (Ekelin et al., 2015).

Survey administration

An online survey was created, and participation was invited to through the mailing lists of the midwives supervising maternity units in the Paris public hospital system and through social networks, such as the French midwives' Facebook group. All participants were asked to forward the e-mail to all the hospital midwives they knew in France. All French midwives working in hospitals (whether private or public, university or not) were eligible to participate, regardless of the hospital site or maternity unit level. This aimed to lead to snowballing dissemination.

Ethics statement

Our institutional Review Board (Comité de Protection des Personnes Ile de France Paris - XI) approved this study (number 12066).

The questionnaire was anonymous; participants provided informed consent to participate by clicking on the survey link and completing the questionnaire. They were informed about the purpose of the study from the start.

Analysis

We began by describing midwives' practices concerning oxytocin administration, inferred from their responses. Then we looked for associations between potential influencing factors and oxytocin use in the clinical vignette.