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Qualitative analysis by interviews and video recordings to establish the components of a skilled rotational forceps delivery

Rachna Bahl [a,*], Deirdre J. Murphy [b], Bryony Strachan [a]

[a] Department of Obstetrics and Gynaecology, St Michael's Hospital, Bristol, United Kingdom
[b] Academic Department of Obstetrics & Gynaecology, Coombe Women & Infants University Hospital & Trinity College, University of Dublin, Dublin 8, Ireland

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ABSTRACT

Objective: To define the skills of a mid-cavity rotational forceps delivery to facilitate transfer of skills from expert obstetricians to trainee obstetricians.
Study design: Qualitative interviews and video analysis carried out at maternity units of two university teaching hospitals (St. Michael's Hospital, Bristol, and Ninewells Hospital, Dundee). Ten obstetricians were identified as experts in conducting operative vaginal deliveries. Semi-structured interviews were carried out to identify key technical skills. The experts were also video recorded conducting mid-cavity rotational deliveries in a simulation setting. The interviews and video recordings were transcribed verbatim and analysed using thematic coding. The anonymised data were individually coded by the three researchers and then compared for consistency of interpretation. The experts reviewed the data for respondent validation. The themes that emerged following the coding were used to formulate a taxonomy of skills.
Results: Rotational forceps were preferred by eight experts and two experts preferred manual rotation followed by direct traction forceps. The final taxonomy included detailed technical skills for Kielland rotational forceps delivery and manual rotation followed by direct traction forceps delivery.
Conclusion: This explicitly defined skills taxonomy could aid trainees' understanding of the technique of rotational forceps delivery. This is an important potential contributor to safely reducing the rate of second-stage caesarean section.

1. Introduction

Caesarean section rates across the developed world are rising. In England the rate of caesarean section has risen from 9% in the 1980s to 21.5% in 2001 [1,2]. The National Sentinel Caesarean Section Audit in the United Kingdom reported that 4% of all caesarean sections were conducted for failure to progress at full dilatation [2]. One of the contributing factors to caesarean section at full dilatation is trainees' lack of confidence in conducting mid-cavity rotational deliveries. A survey of the members of the American College of Obstetrics and Gynaecology showed that more than half of the responders had abandoned mid-cavity deliveries [3]. Experienced obstetricians preferred to use forceps whilst less experienced obstetricians were more likely to use the vacuum extractor. A similar survey in Australia reported that 94% of the final-year trainees did not intend to use Kielland forceps [4]. Whilst use of vacuum extractors may be indicated for a large proportion of mid-cavity deliveries, they are also associated with a greater failure rate [5,6]. This leads to either a caesarean section or the use of more than one instrument to achieve vaginal delivery. Caesarean section following a failed attempt of operative vaginal delivery, as well as sequential use of instruments, is associated with greater maternal and neonatal morbidity [7–13]. A national survey of trainees in obstetrics and gynaecology in the United Kingdom has reported a reduction in operative teaching [14]. Moreover, when being supervised by expert obstetricians, trainees may not always get a very detailed description of the skills involved in conducting these deliveries. It has been shown that experts are often unable to articulate all the subtasks involved in a complex intervention [15,16]. These skills have become automated and the expert does not need to make a conscious effort to recall these skills in order to conduct the task [17]. Therefore there is a need for a detailed skills list of complex operative vaginal deliveries to aid transfer of knowledge from an expert to a novice obstetrician. In this study we aim to use cognitive task analysis (CTA) to develop a well-structured list of skills of mid-cavity rotational delivery to aid training [18]. CTA is a process used to deconstruct expert knowledge and adapt it for the needs of a training package. We have used a similar approach to describe the skill of low-cavity vacuum assisted delivery [19].

* Corresponding author at: Obstetrics and Gynaecology, St. Michael's Hospital, Bristol, BS2 8EG, United Kingdom. Tel.: +00 44 0117 3425345; fax: 0044 117 3425180.
E-mail address: rachnabahl@hotmail.com (R. Bahl).

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2. Materials and methods

The study was based at two UK university teaching hospitals: St. Michael's Hospital, Bristol and Ninewells Hospital and Medical School, Dundee. St. Michael's Hospital has over 5500 deliveries per year and Ninewells Hospital has almost 4000 deliveries per year. Both units are actively involved in organising and conducting teaching for undergraduates and postgraduates. Both units are comparable in terms of rates of induction of labour, use of epidural analgesia, operative vaginal deliveries and caesarean sections. By involving two units from different training regions we aimed to minimise institutional bias towards a particular practice and therefore increase generalisability.

The participants for this study were purposively sampled to allow selection of individuals with in-depth knowledge and expertise in mid-cavity rotational deliveries. For the purpose of this study we define an expert obstetrician as someone who is respected for his/her expertise in conducting operative vaginal deliveries. A list was drawn of all the obstetricians in the unit who had at least five years' experience in obstetrics and gynaecology and a regular session allocated for direct labour ward care. The senior midwives were asked to rank the obstetricians. The criterion for ranking was that the obstetrician was competent and skilled at mid-cavity operative vaginal deliveries. The obstetricians who were consistently ranked highly were invited to take part in the study. The expert midwives were defined as senior midwives who acted as coordinating midwives on labour ward and were ranked highly for their experience and expertise by the midwifery managers and the lead consultant obstetrician for the labour ward. All the invited experts agreed to participate in the study.

By targeting expert participants we aimed to enhance the amount and the quality of data [20]. Having purposely sampled data-rich participants, we anticipated a sample size of ten obstetricians and ten midwives (thirty observations–ten video recordings and twenty interviews), with the plan to continue recruitment till there was saturation of ideas and no new themes emerged. Saturation was reached with ten obstetricians and eight senior midwives in the two centres. Cognitive task analysis (CTA) was used as the basis for interview [18]. An applied cognitive task analysis (ACTA) technique was used to extract the expert knowledge involved in conducting a mid-cavity rotational delivery [21]. The process includes starting by outlining the component tasks and progressively delving into greater detail. We modified ACTA by using video recordings as visual aids to stimulate further description of the task.

The expert obstetricians and the expert midwives were invited to a semi-structured interview. The expert obstetricians were asked to elaborate upon the skills involved in conducting a mid-cavity rotational forceps delivery. The delivery was discussed in detail using an interview guide. The expert midwives were asked to reflect on the good and bad rotational forceps deliveries they had witnessed in similar clinical scenarios, with an emphasis on the operator's skill. Both the expert obstetricians and midwives were asked to discuss some of the common errors they had come across when observing or performing these deliveries.

The interviews were transcribed verbatim and an Atlas.ti computer package was used for coding. The anonymized data were individually coded by the three researchers and then compared for consistency of interpretation. The themes that emerged following the coding were reviewed by individual experts for respondent validation. Data from all of the experts were amalgamated to formulate a skills list which was peer reviewed by three senior obstetricians, outside the study regions, known for their expertise in intrapartum care and operative vaginal deliveries.

2.1. Definitions of commonly used terms relevant to this paper

Rotational forceps: specially designed forceps with blades that lack a pelvic curve to enable rotation of foetal head using the forceps. Kielland forceps are the most commonly used rotational forceps. The forceps also have a sliding lock that allows correction of asynclitism.

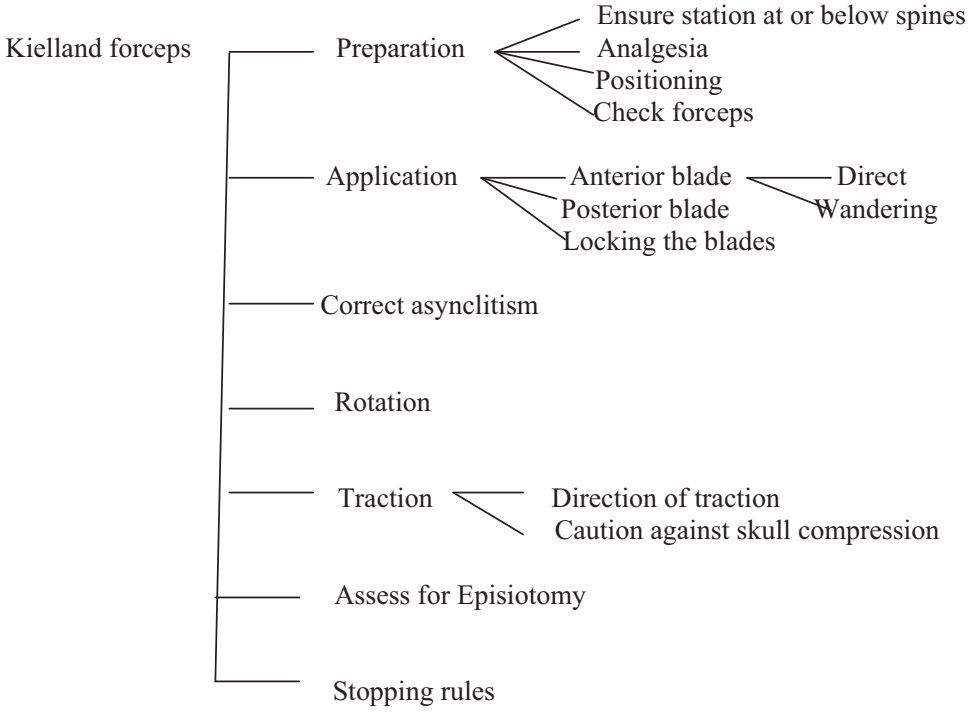

Fig. 1. Coding tree for the task of Kielland forceps delivery.