Operative vaginal delivery

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Abstract

Operative vaginal delivery (OVD) refers to a vaginal birth with the use of any type of forceps or vacuum extractor. Obstetricians should be confident and competent in the use of both instruments for non-rotational delivery and in the use of at least one technique for rotational delivery. The potential for increased maternal and neonatal morbidity in relation to OVD is long established although with careful practice the risk of significant trauma is low. Caesarean section in the second stage of labour is an alternative to operative vaginal delivery, but also carries the risk of significant morbidity and implications for future births. This case-based review gives three illustrative scenarios that highlight the complexity and diversity of the decision making process, and the considerations that must be taken into account when providing care to individual women.

Keywords forceps delivery; instrumental delivery; manual rotation; mid-cavity; non-rotational delivery; operative delivery; outlet delivery; rotational delivery; vacuum extraction; ventouse

Introduction

The terms instrumental delivery, assisted vaginal delivery and operative vaginal delivery are used interchangeably. The goal of operative vaginal delivery (OVD) is to expedite delivery safely with a minimum of maternal or neonatal morbidity. Operative vaginal deliveries account for between 10 and 15% of all deliveries in the UK, with an incidence of one in three for nulliparous women. A systematic approach to OVD takes account of the indication for intervention, the classification of the procedure complexity, and the technical and non-technical aspects of the procedure that ensure safe delivery.

Risk factors for OVD include macrosomia (birth weight over 4 kg), prolonged first stage of labour, fetal malposition and epidural analgesia, each of which may be associated with a prolonged second stage of labour. Fetal risk factors include intrauterine growth restriction, oligohydramnios and placental insufficiency, each of which may result in fetal heart rate abnormalities on the CTG.

Indications

The indications for OVD can be divided into fetal or maternal, although in many cases these factors co-exist.

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Indications for OVD

Fetal	Suspected fetal compromise (CTG pathological, abnormal pH or lactate on fetal blood sampling, thick meconium)
Maternal	Nulliparous women — lack of continuing progress for 3 hours (total of active and passive second stage of labour) with regional anaesthesia, or 2 hours without regional anaesthesia
	Multiparous women — lack of continuing progress for 2 hours (total of active and passive second stage of labour) with regional anaesthesia, or 1 hour without regional anaesthesia
	Maternal exhaustion/vomiting/distress
	Medical indications to avoid prolonged pushing or Valsalva (e.g. cardiac disease, hypertensive crisis, cerebral vascular disease, particularly uncorrected cerebral vascular malformations, myasthenia gravis, spinal cord injury)
Combined	Fetal and maternal indications for assisted vaginal delivery often co-exist. The threshold to intervene may be lower where several factors co-exist

Table 1

The most common fetal factor is suspected fetal compromise usually based on a pathological CTG. The most common maternal factor is a prolonged active second stage of labour. The underlying aetiology for a prolonged second stage of labour should be evaluated in terms of the three Ps — 'Powers, Passages, and Passenger' (Table 1).

Classification

A standard classification of OVD has been developed to allow for clinical audit and comparisons between studies. The Royal College of Obstetricians and Gynaecologists (RCOG) criteria were adapted from the American College of Obstetricians and Gynaecologists (ACOG). They define the delivery by station and position, and the complexity of the delivery is reflected in how low the fetal head has descended within the pelvis (station) and whether or not rotation is required (Table 2).

Safe conditions for OVD

There are a number of prerequisites that must be fulfilled prior to considering OVD. When the safety criteria outlined below are not met, OVD is contraindicated (Table 3).

Case 1

A 30-year-old nulliparous woman is in spontaneous labour at 40 weeks' gestation. You have been called to the room for a fetal bradycardia in the second stage of labour. On abdominal examination the findings are of a clinically average size fetus, 0/5th of the fetal head palpable per abdomen. On vaginal examination there is clear liquor draining, an occipito-anterior (OA) position, vertex is at spines +2 cm, with minimal caput or moulding. The

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Classification of OVD	
Outlet	Fetal scalp visible without separating the labia Fetal skull has reached the pelvic floor Sagittal suture is in the antero-posterior diameter or right or left occiput anterior or posterior position (rotation does not exceed 45°) Fetal head is at or on the perineum
Low	Leading point of the skull (not caput) is at station plus 2 cm or more but not on the pelvic floor Two subdivisions (a) rotation of 45° or less (b) rotation more than 45°
Mid	Fetal head is no more than 1/5 palpable per abdomen, usually 0/5 Leading point of the skull is above station plus 2 cm but not above the ischial spines (station 0−+1) Two subdivisions (a) rotation of 45° or less (b) rotation of more than 45°
High	Not appropriate, therefore not included in classification (station −1 or above)

Table 2

Safety criteria for OVD	
Full abdominal and vaginal examination	Head is ≤1/5 palpable per abdomen (in most cases 0/5 palpable) Cervix is fully dilated and the membranes ruptured Station at level of ischial spines or below (0/+1/+2/+3) Exact position of the head has been determined so correct placement of the instrument can be achieved Caput and moulding is no more than moderate Pelvis is deemed adequate
Preparation of mother	Clear explanation given and informed consent obtained Trust has been established and woman offers full co-operation Appropriate anaesthesia is in place; for mid-pelvic rotational delivery this will usually be a regional block; a pudendal block may be appropriate, in the context of urgency; a perineal block may be sufficient for low-pelvic or outlet delivery Maternal bladder has been emptied recently In-dwelling catheter has been removed or balloon deflated Aseptic technique
Preparation of staff	Operator has the knowledge, experience and skill necessary Adequate facilities are available (appropriate equipment, bed, lighting) and access to an operating theatre Back-up plan in place in case of failure to deliver: For mid-pelvic deliveries, theatre staff should be available immediately to allow a caesarean section to be performed without delay (<30 minutes); senior obstetrician should be present if a junior obstetrician is conducting the delivery Anticipation of complications that may arise (e.g. shoulder dystocia, perineal trauma, postpartum haemorrhage) Personnel present that are trained in neonatal resuscitation

Table 3

woman is of average size with normal pelvic dimensions clinically and no evidence of cephalo-pelvic disproportion. Of note she has no epidural analgesia.

How would you manage this case?

Carefully assess the situation; there is clear evidence of fetal distress on the CTG that requires an urgent response. While performing a vaginal examination, feel for descent of the head with a trial push and evaluate the maternal expulsive effort. If the woman is already pushing − observe to see if the vertex is visible while pushing without the examiner separating the labia. The procedure should be classified as a non-rotational low cavity delivery.

Choice of instrument

Selection of an appropriate instrument depends on both the clinical situation and the operator's level of expertise and experience with the instrument. Factors to be considered include the degree of maternal analgesia, and an appreciation of the risks and benefits of each of the individual instruments. Speed is of the essence in this case, as is the need to avoid failure with the chosen instrument.

Regarding the choice of instrument in a non-rotational low cavity delivery, factors favouring vacuum delivery include: absence of a working epidural, presence of good expulsive efforts, presence of good contractions, absence of marked caput and moulding, and a spacious pelvis. Factors favouring a forceps delivery would include: dense epidural block, absence of good maternal effort, absence of good contractions, marked caput and moulding, and a tight fit in the pelvis (Table 4).

A meta-analysis of ten clinical trials concluded that vacuum-assisted deliveries were associated with significantly less maternal trauma than forceps, and with a reduced need for regional anaesthesia. In contrast, the same review reported that forceps deliveries have a lower risk of scalp injury and cephalohaematoma than vacuum. The incidence of maternal pelvic floor trauma in deliveries performed with the ventouse is significantly less than with forceps; anal sphincter injury in particular is twice as common with forceps delivery (8% versus 3−4%). According to the RCOG greentop guidelines, vacuum delivery is more than twice as likely to be associated with cephalohaematoma (OR 2.4; 95% CI 1.7−3.4) when compared with forceps delivery.

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