European Journal of Obstetrics & Gynecology and Reproductive Biology 227 (2018) 52–59

Contents lists available at ScienceDirect

European Journal of Obstetrics & Gynecology and Reproductive Biology

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

Full length article

Prevention of shoulder dystocia: A randomized controlled trial to evaluate an obstetric maneuver

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ARTICLE INFO

Article history:
Received 3 January 2017
Received in revised form 26 April 2018
Accepted 2 June 2018
Available online xxx

Keywords:
Push back maneuver
Obstetric maneuver
Shoulder dystocia
McRoberts maneuver
Brachial plexus injury

ABSTRACT

Objective: Shoulder dystocia is a major obstetric emergency defined as a failure of delivery of the fetal shoulder(s). This study evaluated whether an obstetric maneuver, the push back maneuver performed gently on the fetal head during delivery, could reduce the risk of shoulder dystocia.
Study design: We performed a multicenter, randomized, single-blind trial to compare the push back maneuver with usual care in parturient women at term. The primary outcome, shoulder dystocia, was considered to have occurred if, after delivery of the fetal head, any additional obstetric maneuver, beginning with the McRoberts maneuver, other than gentle downward traction and episiotomy was required.
Results: We randomly assigned 522 women to the push back maneuver group (group P) and 523 women to the standard vaginal delivery group (group S). Finally, 473 women assigned to group P and 472 women assigned to group S delivered vaginally. The rate of shoulder dystocia was significantly lower in group P (1·5%) than in group S (3·8%) (odds ratio [OR] 0·38 [0·16-0·92]; P = 0·03). After adjustment for predefined main risk factors, dystocia remained significantly lower in group P than in group S. There were no significant between-group differences in neonatal complications, including brachial plexus injury, clavicle fracture, hematoma and generalized asphyxia.
Conclusion: In this trial in 945 women who delivered vaginally, the push back maneuver significantly decreased the risk of shoulder dystocia, as compared with standard vaginal delivery.

Introduction

Shoulder dystocia is a major obstetric emergency that represents the failure of delivery of the fetal shoulder(s) after delivery of the fetal head, despite a downward traction of the fetal head. It occurs in approximately 0.2–3% of deliveries and is principally due to fetal macrosomia and gestational diabetes mellitus (GDM) [1,2]. Neonatal morbidity associated with shoulder dystocia includes transient or permanent brachial plexus palsy, clavicle or humerus fracture, a 5-minute Apgar score of less than 7, neonatal hematoma and neonatal death [3,4].

Two main problems are related to shoulder dystocia. Firstly, this obstetric emergency remains unpredictable and antepartum risk factors (parity, maternal weight gain during pregnancy, history of a previous large baby, effects of diabetes, increasing birth weight) are not useful in predicting shoulder dystocia [5,6]. Secondly, in suspected fetal macrosomia, there is no procedure, notably labor induction, that is effective in preventing shoulder dystocia.

The push back maneuver is a preventive obstetric maneuver that is performed gently on the fetal head, with the aim of helping the anterior shoulder slip behind the symphysis pubis, to give the

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https://doi.org/10.1016/j.ejogrb.2018.06.002
0301-2115/

shoulders more time to enter the pelvic cavity. This concept has previously been suggested by Henriksen, albeit without evidence [7].

pushby 50% or more, and therefore compared this risk in two groups, one using the push back maneuver and the other using a standard vaginal delivery, in normal term parturient women.

Materials and methods

We conducted a prospective, randomized, open-label two-center study. The first center was the Department of Obstetrics and Gynecology, Beaujon Hospital, Assistance Publique-Hôpitaux de Paris (AP-HP), Clichy, France and the second was the Department of Obstetrics and Gynecology, Bichat Hospital, AP-HP, Paris, France. The study ran from March 2011 to December 2013.

The French Health Products Safety Agency (AFSSAPS) approved the study in December 2010 (reference B101169-30). Likewise, the study received ethical approval in February 2011 (reference P091109) from the CPP Ile de France 1, Paris Hôtel-Dieu. All participants signed a written informed consent form before inclusion.

The trial was conducted in accordance with the Declaration of Helsinki and Good Clinical Practice and adhered to French regulatory requirements.

Inclusion criteria for participants were the following: women aged 18 years to 45 years, with health insurance (social security system or universal health coverage system, CMU), with a singleton vertex fetus and a presumed vaginal delivery, independently of the type of anesthesia and the need for instrumental extraction. Women were included during the obstetric consultation between 32 and 37 weeks of gestation.

All women had a clinical or ultrasonography fetal weight estimation after 35 weeks of gestation. Clinical suspicion of macrosomia was defined as an estimated fetal weight greater than 4000 g during the study (between 37 and 41 weeks of gestation). Macrosomia was suspected if the fetal weight estimated ultrasonographically was greater than the 90th percentile. Fetal measurements of the biparietal diameter, abdominal circumference and femur length were obtained and estimated fetal weights were calculated using the Hadlock formula [8].

Once the patient was admitted to the delivery room and before randomization, the secondary exclusion criteria were as follows: patients with cesarean delivery, preterm delivery (gestational age less than 37 weeks) and breech presentation. After randomization, the only predefined exclusion criterion was emergency cesarean delivery.

Patients were randomly assigned, in a 1:1 ratio, to the push back maneuver group (group P) or to the standard group (group S) in the delivery room, using an Internet-based, centralized (CleanWeb software, Télémédecine Technologies, Boulogne, France), computer-generated list stratified by center and with random block sizes to ensure appropriate allocation concealment.

Given the intervention and the primary outcome, blinding of the care provider and of the outcome assessor, could not be carried out.

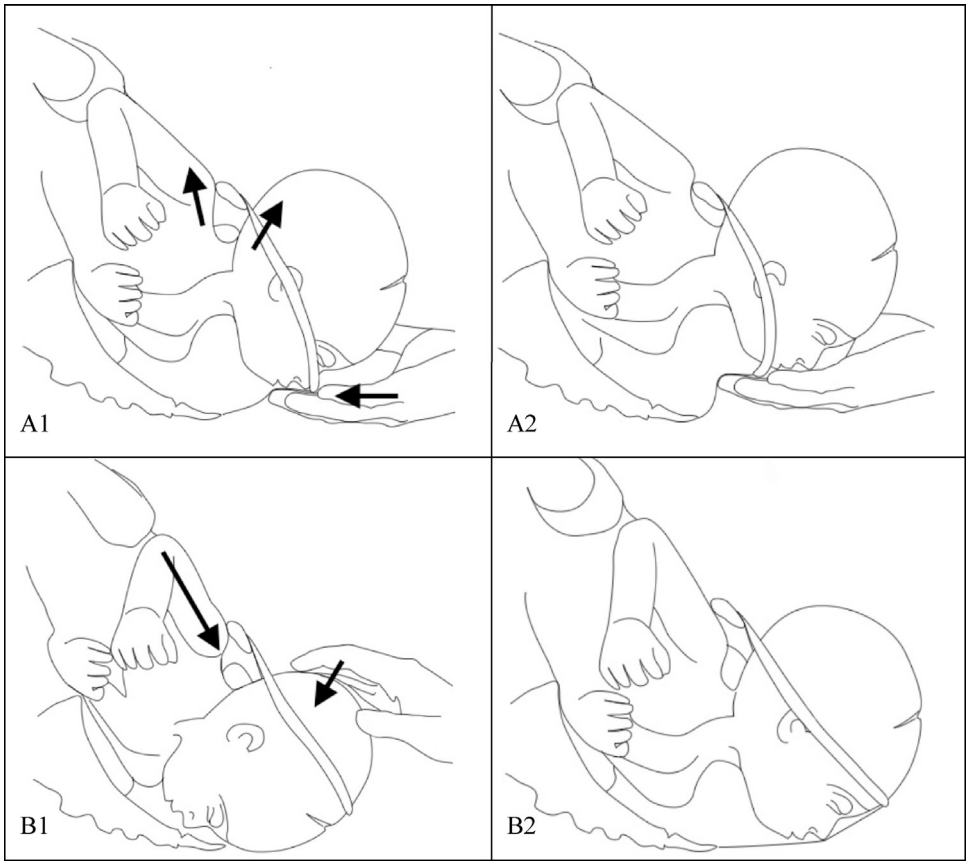

Fig. 1. Combined fetal and maternal illustration of standard vaginal delivery and "Push back" maneuver.
A: Standard vaginal delivery;
A1: the operator (obstetrician or midwife) does not maintain the fetal head flexion and pushes the perineal ring under the neonate's chin, making a rise of the anterior fetal shoulder;
A2: impaction of the anterior shoulder behind the pubic symphysis.
B: "Push back" maneuver;
B1: application of the "push back" maneuver during maternal expulsive efforts, giving the shoulders more time to enter the pelvic cavity and promoting the fetal head flexion;
B2: the "push back" maneuver facilitates the shift of the anterior shoulder from behind the symphysis, allowing delivery to proceed without shoulder dystocia.