West Middlesex University Hospital

Date: 25 January 2018
Sources: Medline, Embase.

External Cephalic Version and CTG Monitoring

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Evidence Summary:

Transient fetal heart rate abnormalities during and after external cephalic version are the most frequently reported complication occurring in approximately 5% of procedures (Collaris, R.J. 2004)

According to the American College of Obstetricians and Gynecologists Practice Bulletin (ACOG, 2016) monitoring should be used for 30 minutes post ECV or longer, if clinically indicated.

A recent prospective cohort study of 908 women gestation>34 weeks who underwent ECV (Cuppens, S.M et al, 2017) reported an increased frequency of fetal heart rate abnormalities for lower estimated fetal weight and with a longer duration procedure.

1. Fetal heart rate abnormalities during and after external cephalic version: Which fetuses are at risk and how are they delivered?

Author(s): Kuppens S.M.; Smailbegovic I.; de Leeuw I.; Hasaart T.H.; Houterman S.

Source: BMC Pregnancy and Childbirth; Oct 2017; vol. 17 (no. 1)

Publication Date: Oct 2017

Publication Type(s): Article

Available at BMC Pregnancy and Childbirth - from BioMed Central

Available at BMC Pregnancy and Childbirth - from Europe PubMed Central - Open Access

Abstract: Background: Fetal heart rate abnormalities (FHR) during and after external cephalic version (ECV) are relatively frequent. They may raise concern about fetal wellbeing. Only occasionally they may lead to an emergency cesarean section. Methods: Prospective cohort study in 980 women (> 34 weeks gestation) with a singleton fetus in breech presentation. During and after external cephalic version (ECV) FHR abnormalities were recorded. Obstetric variables and delivery outcome were evaluated. Primary outcome was to identify which fetuses are at risk for FHR abnormalities. Secondary outcome was to identify a possible relationship between FHR abnormalities during and after ECV and mode of delivery and fetal distress during subsequent labor. Results: The overall success rate of ECV was 60% and in 9% of the attempts there was an abnormal FHR pattern. In two cases FHR abnormalities after ECV led to an emergency CS. Estimated fetal weight per 100 g (OR 0.90, CI: 0.87-0.94) and longer duration of the ECV-procedure (OR 1.13, CI: 1.05-1.21) were factors significantly associated with the occurrence of FHR abnormalities. FHR abnormalities were not associated with the mode of delivery or the occurrence of fetal distress during subsequent labor. Conclusions: FHR abnormalities during and after ECV are more frequent with lower estimated fetal weight and longer duration of the procedure. FHR abnormalities during and after ECV have no consequences for subsequent mode of delivery. They do not predict whether fetal distress will occur during labor. Trial registration: The Eindhoven Breech Intervention Study, NCT00516555. Date of registration: August 13, 2007.

Database: EMBASE

2. The outcomes and risk factors of fetal bradycardia associated with external cephalic version

Author(s): Suyama F.; Ogawa K.; Miwa T.; Taniguchi K.; Nakamura N.; Tanaka S.; Tanigaki S.; Sago H.; Tazaki Y.

Source: Journal of Maternal-Fetal and Neonatal Medicine; Nov 2017 ; p. 1-5

Publication Date: Nov 2017

Publication Type(s): Article In Press

Abstract: Objective: The objective of this study is to assess the outcomes and risk factors of fetal bradycardia after external cephalic version (ECV). Methods: We performed a retrospective study of women who underwent ECV after 35 weeks of gestation in 2010-2016. We assessed the birth outcomes, including umbilical cord artery pH, according to the duration of fetal bradycardia and the risk factors for bradycardia. Results: Among 390 cases, 189 (48.5%) cases showed fetal bradycardia during or immediately after ECV. The duration of fetal bradycardia was <1min (n=82, 43.4%), <5min (n=168, 88.9%); and <10min (n=186, 98.4%). All cases showed a good prognosis. Fetal bradycardia lasting >10min occurred in three cases; emergency cesarean section was performed in each case, with delivery after 12-4min of bradycardia. Two of three cases showed low Apgar scores at 5min, with an umbilical cord arterial pH of <7.1. Lower maternal BMI and a prolonged ECV procedure were significantly associated with bradycardia (p for trend: .016 and .015, respectively). Conclusions: Fetal bradycardia lasting >10min after ECV was a risk factor for asphyxia. Thus, delivery should be completed within 10min after bradycardia. A low maternal BMI and a prolonged ECV procedure were risk factors for bradycardia after ECV.

Database: EMBASE

3. Practice Bulletin No. 161: External Cephalic Version.

Author(s): American College of Obstetricians and Gynecologists' Committee on Practice Bulletins--Obstetrics

Source: Obstetrics and gynecology; Feb 2016; vol. 127 (no. 2); p. e54

Publication Date: Feb 2016

Publication Type(s): Practice Guideline Journal Article

PubMedID: 26942387

Abstract: In the United States, there is a widespread belief that the overall cesarean delivery rate is higher than necessary. Efforts are being directed toward decreasing the number of these procedures, in part by encouraging physicians to make changes in their management practices. Because breech presentations are associated with a high rate of cesarean delivery, there is renewed interest in techniques such as external cephalic version (ECV) and vaginal breech delivery. The purpose of this document is to provide information about ECV by summarizing the relevant evidence presented in published studies and to make recommendations regarding its use in obstetric practice.

Database: Medline

4. Computerized analysis of fetal heart rate changes after antepartum external cephalic version

Author(s): Weiner Z.; Farmakides G.; Hsieh H.; Maulik D.

Source: Journal of Reproductive Medicine for the Obstetrician and Gynecologist; Sep 1996; vol. 41 (no. 9); p. 680-684

Publication Date: Sep 1996

Publication Type(s): Article

PubMedID: 8887194

Abstract:OBJECTIVE: To assess the fetal heart rate (FHR) changes following external cephalic version using a computerized FHR monitor. STUDY DESIGN: We performed 116 external cephalic versions on 106 pregnant women at 36-40 weeks' gestation. Tocolysis (magnesium sulfate) teas given to 39 patients (34%). Computerized FHR monitoring was per formed for 20-30 minutes before and for 20-30 minutes after the procedure. In addition, we analyzed the results of the FHR tracing obtained during the first 10 minutes following the procedure. RESULTS: External cephalic version was successful in 40% of the patients. In the group of patients who were not treated with magnesium sulfate, FHR variation and the number of accelerations per 10 minutes were significantly reduced during the first 10 minutes following the procedure as compared with those factors on the FHR tracings obtained before or 20-30 minutes following the procedure ($P < .05$). In the group of patients who were treated with magnesium sulfate, FHR variation and the number of accelerations per 10 minutes were significantly reduced before and 10 minutes after the procedure as compared with the FHR tracings obtained 20-30 minutes following the procedure ($P < .05$). In both groups the basal FHR was significantly lower during the first 20-30 minutes following the procedure ($P < .05$). FHR decelerations were observed following the procedure in only two patients. None of the 106 fetuses had a low Apgar score or were admitted to the neonatal intensive care unit. CONCLUSION: External cephalic version appears to be safe for the mother and fetus, although transient FHR changes may occur following the procedure.

Database: EMBASE

5. An observational study of the success and complications of 2546 external cephalic versions in low-risk pregnant women performed by trained midwives.

Author(s): Beuckens, A; Rijnders, M; Verburgt-Doeleman, G H M; Rijninks-van Driel, G C; Thorpe, J; Hutton, E K

Source: BJOG : an international journal of obstetrics and gynaecology; Feb 2016; vol. 123 (no. 3); p. 415-423

Publication Date: Feb 2016

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article Observational Study

PubMedID: 25639281

Abstract:OBJECTIVETo evaluate the success of an external cephalic version (ECV) training programme, and to determine the rates of successful ECV, complications, and caesarean birth in a low-risk population.DESIGNProspective observational study.SETTINGPrimary health care and hospital settings throughout the Netherlands (January 2008-September 2011).POPULATIONLow-risk women with a singleton fetus in breech presentation, without contraindications to ECV, were offered ECV at approximately 36 weeks of gestation.METHODSData were collected for all ECVs performed by midwives, and were entered into a national online database.MAIN MEASURESSuccessful ECV was defined as the fetus having a cephalic presentation immediately following the procedure and at birth. Complications were observed at ≤ 30 minutes and between 30 minutes and 48 hours after the ECV procedure. All serious pregnancy outcomes that occurred after the ECV procedure until birth were reported.RESULTSA total of 47% had a successful ECv and a cephalic at the time of birth: 34% of nulliparous and 66% of multiparous women. After ECV, 57% of women gave birth vaginally: 45% of nulliparous women and 76% of multiparous women. Within 30 minutes after ECV, and between 30 minutes and 48 hours after ECV, the proportion of women experiencing a complication or serious pregnancy outcome was 0.9% and 1.8%, respectively. Serious pregnancy outcome at any time following ECV until birth was experienced by 58 (2.5%) of the women.CONCLUSIONSThe success rate of ECVs performed by trained midwives in primary health care or hospital settings is comparable with that of other providers, and the procedure is safe for low-risk women.

Database: Medline

6. Fetal heart rate changes following external cephalic version under tocolysis near term.

Author(s): Rabinovici, J; Barkai, G; Shalev, J; Mashiach, S

Source: International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics; Aug 1987; vol. 25 (no. 4); p. 277-281

Publication Date: Aug 1987

Publication Type(s): Journal Article

PubMedID: 2887461

Abstract: Fifty eight gravidas near-term underwent external cephalic version using tocolytic treatment and continuous fetal monitoring by cardiotocograph and real-time ultrasound. No unfavorable maternal or fetal effects were recorded. Fetal heart rates showed a significant decline at 10 and 30 min after the procedure with complete recovery at 1 h after external version, but no pathologic tracing was recorded. No uniform heart rate patterns due to external cephalic version could be found.

Database: Medline

7. Observations of fetal heart rate characteristics related to external cephalic version and tocolysis.

Author(s): Phelan, J P; Stine, L E; Mueller, E; McCart, D; Yeh, S

Source: American journal of obstetrics and gynecology; Jul 1984; vol. 149 (no. 6); p. 658-661

Publication Date: Jul 1984

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article

PubMedID: 6742049

Abstract: External cephalic version performed in conjunction with tocolysis in the term breech presentation has been found to decrease the number of breech presentations at delivery and thus reduce the number of cesarean sections for breech presentation. However, information regarding the fetal heart rate (FHR) patterns associated with version is limited. In an attempt to broaden our understanding of the FHR changes that occur in association with version, the FHR tracings of 141 patients who had undergone version were analyzed. Approximately 39% of the fetuses exhibited changes in FHR characteristics during and/or after attempted version. These FHR changes were primarily manifested as bradycardias and/or decelerations. However, some of the fetuses (less than 5%) demonstrated a tachycardia or sine wave pattern. All of these FHR changes were transient and bore no apparent relationship to the subsequent outcome of the fetus. In addition to these FHR alterations, the incidence of diminished FHR variability (less than or equal to 5 bpm) was significantly higher after version than before version (p less than 0.01). The decline in FHR variability lasted 15 +/- 12 minutes. While this decline in variability appeared to be related to the success or failure of the version, the decreased variability observed after version was found to be unrelated to the tocolytic agent used and to the subsequent fetal outcome. In summary, alterations in FHR activity were frequent during the version process. All were transient and most responded to cessation of manipulation. Subsequent fetal outcome was apparently unrelated to the observed FHR alterations. Nonetheless, continuous fetal monitoring during and after the version is recommended.

Database: Medline

8. Cardiotocographic changes after external cephalic version.

Author(s): Hofmeyr, G J; Sonnendecker, E W

Source: British journal of obstetrics and gynaecology; Oct 1983; vol. 90 (no. 10); p. 914-918

Publication Date: Oct 1983

Publication Type(s): Journal Article

PubMedID: 6626491

Abstract: Cardiotocographic tracings before and after 53 attempts at external cephalic version (ECV) in 52 patients were analysed. Hexoprenaline (Ipradol) was used to facilitate ECV in 25 of the 53 attempts. There was a significant decrease in fetal movements and fetal heart rate (FHR) variability and reactivity after external cephalic version; temporary baseline bradycardia occurred in five patients. The most likely explanation for the changes observed is that they represent the fetal response to a period of stress caused by decreased uteroplacental blood flow during the procedure.

Database: Medline

Strategy 357671

#	Database	Search term	Results
1	Medline	("external cephalic version").ti,ab	588
2	Medline	exp "VERSION, FETAL"/	749
3	Medline	("Fetal Version").ti,ab	15
4	Medline	(ECV).ti,ab	1483
5	Medline	(1 OR 2 OR 3 OR 4)	2147
6	Medline	(CTG).ti,ab	3456
7	Medline	exp CARDIOTOCOGRAPHY/	1811
8	Medline	(Cardiotocogra*).ti,ab	2101
9	Medline	(6 OR 7 OR 8)	5869
10	Medline	(5 AND 9)	23
11	Medline	("manual rotation").ti,ab	102
12	Medline	(9 AND 11)	2
13	EMBASE	("external cephalic version").ti,ab	771
14	EMBASE	exp "VERSION, FETAL"/	380
15	EMBASE	("Fetal Version").ti,ab	14
16	EMBASE	(ECV).ti,ab	3488
17	EMBASE	(13 OR 14 OR 15 OR 16)	3984
18	EMBASE	(CTG).ti,ab	4852
19	EMBASE	exp CARDIOTOCOGRAPHY/	4204

20	EMBASE	(Cardiotocogra*).ti,ab	2870
21	EMBASE	(18 OR 19 OR 20)	9006
22	EMBASE	(17 AND 21)	44
23	EMBASE	exp "FETUS HEART RATE"/	9564
24	EMBASE	exp "FETUS HEART RATE MONITORING"/	1574
25	EMBASE	(23 OR 24)	10590
26	EMBASE	(17 AND 25)	66
27	Medline	exp "HEART RATE, FETAL"/	4681
28	Medline	("fetal heart rate" OR "fetus heart rate" OR FHR).ti,ab	6282
29	Medline	(27 OR 28)	8271
30	Medline	(5 AND 29)	39
31	CINAHL	("external cephalic version").ti,ab	176
32	CINAHL	exp "VERSION, FETAL"/	240
33	CINAHL	("Fetal Version").ti,ab	1
34	CINAHL	(ECV).ti,ab	134
35	CINAHL	(31 OR 32 OR 33 OR 34)	358
36	CINAHL	(CTG).ti,ab	332
37	CINAHL	exp CARDIOTOCOGRAPHY/	312
38	CINAHL	(Cardiotocogra*).ti,ab	244
40	CINAHL	exp "HEART RATE, FETAL"/	1022
41	CINAHL	("fetal heart rate" OR "fetus heart rate" OR FHR).ti,ab	851

42	CINAHL	(36 OR 37 OR 38 OR 40 OR 41)	1868
43	CINAHL	(35 AND 42)	10
44	EMBASE	exp "FETUS HEART"/	6136
45	EMBASE	(17 AND 44)	5
46	EMBASE	("success rate").ti,ab	60700
47	EMBASE	(17 AND 46)	239
48	EMBASE	(return*).ti,ab	277694
49	EMBASE	(return*).ti,ab	277694
50	EMBASE	(17 AND 49)	40
51	EMBASE	exp "TREATMENT FAILURE"/	122698
52	EMBASE	(17 AND 51)	26
53	EMBASE	(spontaneous ADJ2 reversion).ti,ab	264
54	EMBASE	(17 AND 53)	11
55	Medline	(spontaneous ADJ2 reversion).ti,ab	294
56	Medline	(5 AND 55)	8
57	Medline	(Moxibustion).ti,ab	2048
58	Medline	exp MOXIBUSTION/	1537
59	Medline	exp "ACUPUNCTURE THERAPY"/ OR exp ACUPUNCTURE/	21620
60	Medline	(acupuncture).ti,ab	18691
61	Medline	(57 OR 58 OR 59 OR 60)	26176

62	Medline	(breech).ti,ab	4286
63	Medline	exp "BREECH PRESENTATION"/	2931
64	Medline	(62 OR 63)	4934
65	Medline	(61 AND 64)	67
66	EMBASE	(Moxibustion).ti,ab	2626
67	EMBASE	exp MOXIBUSTION/	2380
68	EMBASE	exp ACUPUNCTURE/	41135
69	EMBASE	(acupuncture).ti,ab	27098
70	EMBASE	(66 OR 67 OR 68 OR 69)	43485
71	EMBASE	(breech).ti,ab	5362
72	EMBASE	exp "BREECH PRESENTATION"/	4373
73	EMBASE	(71 OR 72)	6846
74	EMBASE	(70 AND 73)	109
75	EMBASE	exp "FETUS DISTRESS"/	7095
76	EMBASE	(17 AND 75)	0
77	EMBASE	exp "FETUS MONITORING"/	13433
78	EMBASE	(17 AND 77)	61
79	Medline	("30 minutes").ti,ab	34041
80	Medline	(5 AND 79)	12
81	EMBASE	("30 minutes").ti,ab	52997
82	EMBASE	(17 AND 81)	25

83	CINAHL	("30 minutes").ti,ab	4450
84	CINAHL	(42 AND 83)	24
85	CINAHL	(spontaneous ADJ2 reversion).ti,ab	5
86	Medline	(55 AND 64)	7
87	EMBASE	(53 AND 73)	10
88	EMBASE	exp "HEART ARRHYTHMIA"/	398413
90	EMBASE	(14 AND 88)	36
91	Medline	exp "ARRHYTHMIAS, CARDIAC"/	189540
92	Medline	(5 AND 91)	101
93	Medline	(2 AND 91)	9