

## **Appendix 1. Iterative and Standardized Surgical Approaches to Uterine Entry for Fetoscopic Neural Tube Defect Repair<sup>1</sup>**

For both the iterative and standardized surgical approaches, the uterus was exteriorized through a low transverse abdominal incision and the fetus manipulated into position using an external version technique. Under ultrasound guidance, two 2/0 polydioxanone stitches were placed to plicate the membranes to the uterine wall. In the iterative technique, four sutures were placed in a box pattern; in the standardized technique, two parallel sutures were placed. In both, a port was introduced between the sutures into the amniotic cavity using the Seldinger technique, then approximately 300 mL of amniotic fluid was withdrawn and carbon dioxide was insufflated (0.5 L/min, 1262 mm Hg) through a heater–humidifier. A pediatric cystoscope (iterative) or a straight endoscope (standardized) was placed into the gas pocket through the port. Under fetoscopic vision, we then placed plication sutures and additional ports, depending on whether the technique was iterative or standardized. In the first 15 attempted cases, we developed an iterative technique that used two ports for nine patients and three ports for six patients with a combination of 5-French, 7-French, 12-French, and 16-French ports. In addition, we tried different instruments, needles, and sutures (barbed monofilament, braided, monofilament standard, braided Quikstitch) and closure techniques. After 15 attempted cases (11 fetoscopic cases, three hybrid cases with a hysterotomy, one abandoned case), we standardized our approach to use two ports (12-French), a straight endoscope, interrupted vertical mattress sutures, and a knot pusher to deliver an extracorporeal modified Meltzer knot in a braided polyglactin–monocryl suture.<sup>1</sup>

### **Reference**

1. Belfort MA, Whitehead WE, Shamshirsaz AA, Bateni ZH, Olutoye OO, Olutoye OA, et al. Fetoscopic Open Neural Tube Defect Repair: Development and Refinement of a Two-Port, Carbon Dioxide Insufflation Technique. *Obstet Gynecol* 2017 Apr;129(4):734-43.

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## Appendix 2. Management of All Patients Who Experienced Labor

Year	GA at Labor (wk.day)	Labor type	Rupture	Analgesia	Duration of labor (hours)	Repair to delivery (wk.day)	GA at Delivery (wk.day)	Fetal heart tracing	Delivery (Indication)	EBL (mL)	Birth weight (g)	Birth weight %ile	1 min Apgar	5 min Apgar	Umbilical artery pH
2015	38.3	Induced	AROM	Epidural	53.2	12.6	38.5	Cat 2	SVD, Kielland forceps (arrest of descent, NRFHTs, deflex OP)	200	2630	11	3	9	7.17
2015	35.5	Induced	SROM	Epidural	8.1	12.6	35.5	Cat 1	SVD	300	2290	25	8	9	7.28
2016	38.6	Induced	SROM	Epidural	27.6	14.4	39.0	Cat 1	SVD	700	2945	33	9	9	7.35
2016	39.4	Induced	AROM	Epidural	19.6	14.2	39.5	Cat 2	SVD	500	3856	88	8	9	-
2016	39.0	Induced	AROM	Epidural	38.5	15.1	39.1	Cat 2	SVD	500	2920	19	9	9	-
2016	39.0	Induced	-	Epidural, General	55.1	14.3	39.2	Cat 2	Cesarean, urgent (NRFHTs)	800	3816	89	8	9	7.33
2016	38.5	Augmented	AROM	Epidural	12.5	14.0	38.5	Cat 1	SVD	400	2630	11	8	9	7.33
2017	37.4	Augmented	SROM	Epidural	22.1	11.6	37.5	Cat 1	SVD	250	3340	85	8	9	7.31
2017	37.3	Augmented	AROM	Epidural	25.3	12.6	37.4	Cat 2	SVD, Vacuum (NRFHTs)	480	2900	40	8	9	7.24
2017	40.4	Augmented	AROM	Epidural	27.1	16.1	40.5	Cat 2	Cesarean, urgent (NRFHTs)	800	3515	67	6	7	7.21
2018	39.4	Augmented	SROM	Epidural	15.6	15.3	39.5	Cat 1	SVD	300	3845	88	8	9	-
2015	26.0	Spontaneous	SROM	Epidural	Precipitous	0.3	26.0	Cat 1	SVD	100	870	59	6	8	-
2015	31.3	Spontaneous	SROM	Epidural	1.9	6.1	31.4	Cat 2	SVD	300	1650	61	8	9	7.29
2015	38.1	Spontaneous	AROM	None	9.0	12.2	38.1	Cat 3	SVD	200	2821	32	8	9	-
2016	35.6	Spontaneous	SROM	Epidural	3.4	10.2	35.6	Cat 1	SVD	400	3185	93	7	8	7.21
2017	34.6	Spontaneous	SROM	Epidural	49.6	10.2	34.6	Cat 2	SVD	300	2675	72	8	9	7.23
2017	40.2	Spontaneous	AROM	None	12.9	15.3	40.2	Cat 1	SVD	400	3685	83	9	9	-
2017	38.1	Spontaneous	SROM	None	10.0	13.0	38.1	Cat 1	SVD, VBAC	350	3745	93	9	9	7.29
2017	38.6	Spontaneous	SROM	Epidural	17.9	13.3	38.6	Cat 2	SVD, Kielland forceps (arrest of descent, occiput transverse)	500	3600	88	8	9	7.22
2016	38.0	Spontaneous	-	CSE	3.1	12.6	38.0	Cat 1	Cesarean, urgent (breech)	600	3265	77	7	9	7.31
2017	38.4	Spontaneous	-	CSE	6.2	13.2	38.4	Cat 1	Cesarean, urgent (breech)	700	2590	10	8	9	-
2015	33.1	Spontaneous	-	CSE	2.3	7.4	33.1	Cat 2	Cesarean, urgent (NRFHTs)	700	2466	93	7	8	7.32
2015	31.3	Spontaneous	-	General	11.1	7.1	31.3	Cat 3	Cesarean, urgent (NRFHTs)	800	1980	84	2	5	7.25
2016	39.5	Spontaneous	AROM	General	43.8	14.3	40.0	Cat 2	Cesarean, urgent (NRFHTs)	1000	3535	64	2	9	7.28

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2016	39.0	Spontaneous	AROM	Epidural	7.8	14.4	39.0	Cat 2	Cesarean, urgent (NRFHTs)	900	3315	68	9	9	7.29
2017	29.6	Spontaneous	SROM	CSE	2.5	5.4	29.6	Cat 2	Cesarean, urgent (NRFHTs)	500	1375	65	9	9	7.33

GA: Gestational age. Wk: week. AROM: Artificial rupture of membranes. SROM: Spontaneous rupture of membranes. Cat: Category. SVD: Spontaneous vaginal delivery. OP: Occiput posterior.

NRFHT: Non-reassuring fetal heart tracing. EBL: Estimated blood loss. MI: Milliliters. G: Grams. %ile: Percentile. CSE: combined spinal-epidural.

### Appendix 3. Use of Oxytocin and Cervical Ripening for Indicated Patients

Year	GA at Labor (wk.day)	Labor onset	Simple Bishop	Cervical ripening	Ripen duration (hours)	Oxytocin indication	Initial (mU/min)	Oxytocin increase Units	Interval	Oxytocin max dose Prescribed (mU/min)	Oxytocin max dose Received (mU/min)	Oxytocin duration (hours)
2015	38.3	Induced	3	None	-	Induction (Severe IUGR, Cat 2 FHTs occurred before contraction stress test**)	2	1-2 mU	45 min	20	20	24.4
2015	35.5	Induced	6	None	-	Induction (Preterm PROM)	2	2 mU	60 min	36	14	8.6
2016	39.0	Induced	3	Yes, dinoprostone (c/b uterine tachysystole)	6.3	Induction (Macrocephaly: HC >95th percentile)	2	1-2 mU	45 min	30	30	36.0
2016	39.4	Induced	1	Yes, misoprostol	7.0	Induction (PROM)	2	1-2 mU	30 min	20	16	5.8
2016	39.0	Induced	6	None	-	Induction (presented for LOF; recurrent decels; negative contraction stress test**)	2	2 mU	45 min	20	20	21.4
2016	38.6	Induced	2	None	-	Induction (IUGR)	2	2 mU	60 min	30	28	26.3
2016	38.5	Spontaneous	-	-	-	Augment (slow progress)	1	1 mU	60 min	10	2	5.3
2017	37.3	Spontaneous	-	-	-	Augment (slow progress)	1	1 mU	45 min	20	6	13.9
2017	40.4	Spontaneous	-	-	-	Augment (slow progress)	2	2 mU	45 min	20	15	24.0
2017	37.4	Spontaneous	-	-	-	Augment (slow progress)	1	1 mU	60 min	20	6	5.5
2018	39.4	Spontaneous	-	-	-	Augment (slow progress)	2	2 mU	60 min	20	6	5.6

GA: Gestational age. Wk: week. C/b: complicated by. IUGR: Intrauterine growth restriction. FHT: Fetal heart tracing. \*\*Negative contraction stress test defined as “the absence of late or significant variable decelerations with at least 3 uterine contractions (lasting 40 seconds) over a 10-minute period.”<sup>13</sup> PROM: Prelabor rupture of membranes. HC: Head circumference. LOF: Leakage of fluid. mU: Milliunit. Min: minutes.

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