ACTA BIO MEDICA ATENEO PARMENSE 2004; 75; Suppl. 1: 31-33

CONFERENCE REPORT

Amnioreduction

Dario Coviello, Francesca Bonati, Sara Moretti Montefusco, Cristina Mastromatteo, Isabella Fabietti, Mariangela Rustico

Obstetric and Gynecology Operative Unit - ICP V. Buzzi Hospital, Milan, Italy

Abstract. Pregnancies complicated by hydramnios are at increased risk of both maternal and fetal complications. Since amniotic pressure is elevated in polyhydramnios, it has been suggested that the complications may be mediated by anomalies connected with amniotic pressure. The rationale behind amnioreduction is thus to restore normal amniotic pressure by draining a large amount of amniotic fluid volume in order to reduce maternal discomfort, improve uteroplacental perfusion, and prolong pregnancy by limiting the risk of preterm labour and rupture of the membranes. The procedure has a complication rate in terms of spontaneous premature rupture of membranes, abruptio placenta, or chorioamnionitis, regardless of the technique adopted.

Key words: Polyhydramnios, twin-to-twin transfusion syndrome, amniodrainage, amniotic fluid pressure

Background

Increased amniotic fluid volume complicates approximately 1% of pregnancies, and can be a common feature in many conditions, mostly related to monochorionic twin pregnancies and fetal malformations (1, 2). Pregnancies with increased amniotic fluid – regardless of the cause – are at increased risk of both maternal and fetal complications. Since amniotic pressure (AP) is elevated in polyhydramnios (particularly with a vertical pocket of amniotic fluid >/= 15 cm, or amniotic fluid index >40) it has been suggested that the complications may be mediated by anomalies related to AP (3). With the observation that amniotic fluid drainage in severe polyhydramnios reduces AP, it was hypothesized that its normalization might have a beneficial effect on the complications (4).

Technical aspects

The rationale behind amnioreduction is restoration of normal amniotic fluid volume in order to reduce maternal discomfort, improve uteroplacental perfusion, and prolong pregnancy by limiting the risk of preterm labour and rupture of the membranes. The procedure was first performed by Rivett in 1933, after it was surmised that amnioreduction might alleviate the mother's symptoms and prolong pregnancy.

When procedures were first attempted, only small amounts of amniotic fluid were drained, for fear of serious complications such as abruptio placenta or induction of labour. It was shown that while there was indeed a beneficial effect on amniotic pressure, large amounts of fluid soon built up again, as did the intra-amniotic pressure. This led to the conclusion that the clinical aim of the procedure should be to obtain a normal volume of amniotic fluid (5), and therefore, a much larger amount of amniotic fluid should be drained. This has led to the concept of "aggressive therapeutic amniocentesis", or repeated drainage of large quantities of amniotic fluid: the technique proved effective in both singleton and twin pregnancies (6). Amnioreduction is presently performed using two different techniques, a standard technique and radical technique.

Standard amnioreduction
– needle: 20-gauge spinal needle, at any gestational age (as in our practice), or for pregnancies before 20 weeks; 18-gauge needle in pregnancies after 20 weeks
– aspiration system : needle connected to a vacuum drainage system or to a 30 mL syringe (as in our practice of manual aspiration).
– Volume/time: 45-90 ml/min
– time : 60–120 minutes, or more (7)
– end of the procedure: when the amniotic fluid is judged to be normal at ultrasound (deepest vertical pocket less than 7-8 cm)
– patient: uncomfortable

Radical amnioreduction
– needle: 18-gauge needle in pregnancies after 20 weeks; 20-gauge spinal needle for pregnancies before 20 weeks
– aspiration system : needle connected to a vacuum drainage system
– volume/time: 140 ml/min
– time : less than 30 minutes (8)
– end of the procedure: until oligohydramnios is obtained
– patient: limited discomfort

Alternative techniques: passive amnioreduction or chronic drainage catheters. These would appear to be of little advantage because of the high incidence of infections and/or blockage complications due to kinking of the soft catheter as the uterus decreases in size.

Complications

The potential complications of amnioreduction are contractions, rupture of membranes, chorioamnionitis, and abruptio placenta (9). According to the most recent data, the fear of causing abruptio placenta by removing such large quantities of amniotic fluid (based on dated observations without any ultrasound monitoring of the procedure) (10) is groundless. In a series of 200 large volume amnioreductions three complications (1.5%) were observed : one case of amnionitis, one rupture of the membranes, and one abruptio placenta after over 10 litres of amniotic fluid were removed (6).

In our experience, using the standard technique of manual aspiration with a 30 mL syringe in a series of 24 twin pregnancies with twin-twin transfusion syndrome, for a total of 78 amnioreductions, there was only one case of ruptures membranes at 27 weeks' gestation, after the sixth procedure (Tab. 1).

In a large series of 760 amnioreductions for twin-twin transfusion syndrome comprising 223 sets of twins, complications within 18 hours included ruptu-

Table 1. Standard and radical amniodrainage: technical characteristics and complications rate

N sets of twin (N. AD)	Technique AD (manual aspiration, vacuum)	GA at referral Mean (range)	N° AD / patient Mean (range)	Total Volume removed /pat Mean (range)	Complications N°
N 24 (78) our serie	STANDARD (20 gauge needle, manual AD)	21 (16-27)	3,2 (1-9)	1580 mL (550-3300)	1 PROM
N 223 (760) Ref 11	STANDARD (18-20 gauge needle, vacuum system AD)	21 14-27	2 1-31	3550 140-30.740	14 PROM 3 Abruptio 2 Infections 8 fetal death
N 15 (N 22) Ref 8	RADICAL (18-20 gauge needle, vacuum system AD)	23 (16-30)	1,5 (1-3)	3252 mL	1 PROM 1 persistent bradicardia

AD: amniodrainage; GA: gestational age; PROM: premature rupture of membranes

red membranes in 6.2% of pregnancies, placental abruptio in 1.3% and two cases (0.9%) of amnionitis (11). Intra-amniotic bleeding has also been reported in standard amnioreduction suggesting that the longer duration of the procedure increase the risk of direct damage to the placenta or membranes (8). It is difficult to compare the available data and it is not possible to judge one technique of amnioreduction as being less traumatic than another. When counselling pregnant women with twin-twin transfusion syndrome it is essential to consider also those complications directly connected to the procedure of amnioreduction in itself.

References

1. Ross MG, Brace RA. National Institute of Child Health and Development Conference summary: amniotic fluid biology-basic and clinical aspects. *Journal of Mat Fet Med* 2001; 10 (1): 2-19.
2. Hill L, Krohn M, Lazebnik N, Tush B, Boyles D, Ursiny JJ. The amniotic fluid index in normal pregnancies. *Am J Obstet Gynecol* 2000; 182 (4): 950-4.
3. Nicolini U, Fisk NM, Talbert DG, et al. Intrauterine manometry: technique and application to fetal pathology. *Prenat Diagn* 1989; 9: 243-54.
4. Fisk NM, Tannirandorn Y, Nicolini U, Talbert DG, Rodeck GH. Amniotic pressure in disorders of amniotic fluid volume. *Obstet Gynecol* 1990; 76: 210-4.
5. Urig MA, Clewell WH, Elliott JP. Twin-twin transfusion syndrome. *Am J Obstet Gynecol* 1990; 163: 1522-6.
6. Elliott JP, Sawyer AT, Radin TG, Strong RE. Large volume therapeutic amniocentesis in the treatment of hydramnios. *Obstet Gynecol* 1994; 84: 1027-1027.
7. Trespidi L, Boschetto C, Caravelli E, Villa L, Kustermann A, Nicolini U. Serial amniocenteses in the management of twin-twin transfusion syndrome: when is it valuable. *Fetal Diagn Ther* 1997; 12: 15-20.
8. Jauniaux E, Holmes A, Hyett J, Yates R, Rodeck C. Rapid and radical amniodrainage in the treatment of severe twin-twin transfusion syndrome. *Prenat Diagn* 2001; 21: 471-6.
9. Dennis LG, Winkler CL. Twin-to-twin transfusion syndrome: Aggressive therapeutic amniocentesis. *Am J Obstet Gynecol* 1997; 177 (2): 342-7.
10. Pritchard JA, Mason R, Corley M, Pritchard S. Genesis of severe placental abruption. *Am J Obstet Gynecol* 1970; 108: 22-7.
11. Mari G, Roberts A, Detti L, et al. Perinatal morbidity and mortality rates in severe twin-twin transfusion syndrome: results of the International Amnioreduction Registry. *Am J Obstet Gynecol* 2001; 185: 708-15.

Correspondence: Dario Coviello
Obstetric and Gynecology Operative Unit
V. Buzzi Hospital
via Castelvetro 32
20136 Milano (Italy)
Tel: +39 02 5799 5361
Fax: +39 02 5799 5375
E-mail: dariaugusto.coviello@tin.it