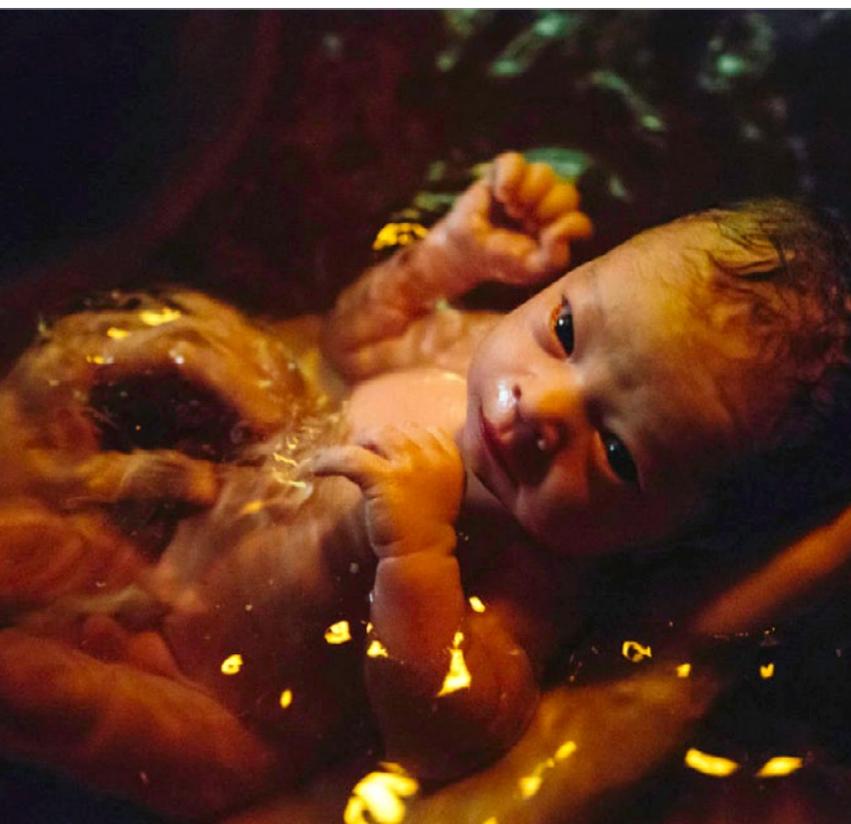


SWISS SOCIETY OF NEONATOLOGY

# Aspiration pneumonia in a newborn following water birth

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Title figure:

Baby after waterbirth (Source: [www.npr.org](http://www.npr.org)).

## INTRODUCTION

Warm water immersion has been used for many years for relaxation and pain relief during labor and delivery. In 2009, a systematic review of randomized trials evaluating the safety and efficacy of water immersion during the first stage of labor, concluded that the intervention reduces the use of epidural/spinal analgesia and the duration of the first stage of labor (1). There was no evidence of increased adverse events in the fetus/neonate or woman associated with laboring in water or waterbirth.

In response to this review and other data, the American College of Obstetricians and Gynecologists (ACOG) concluded that water immersion during the first stage of labor «may be offered to healthy women with uncomplicated pregnancies between 37+0 and 41+6 weeks of gestation» (2). Doctors, parents and birthing organizations have produced statements both supporting and criticizing water birthing ever since.

We report a newborn baby who unexpectedly developed acute respiratory distress from aspiration during water birth.

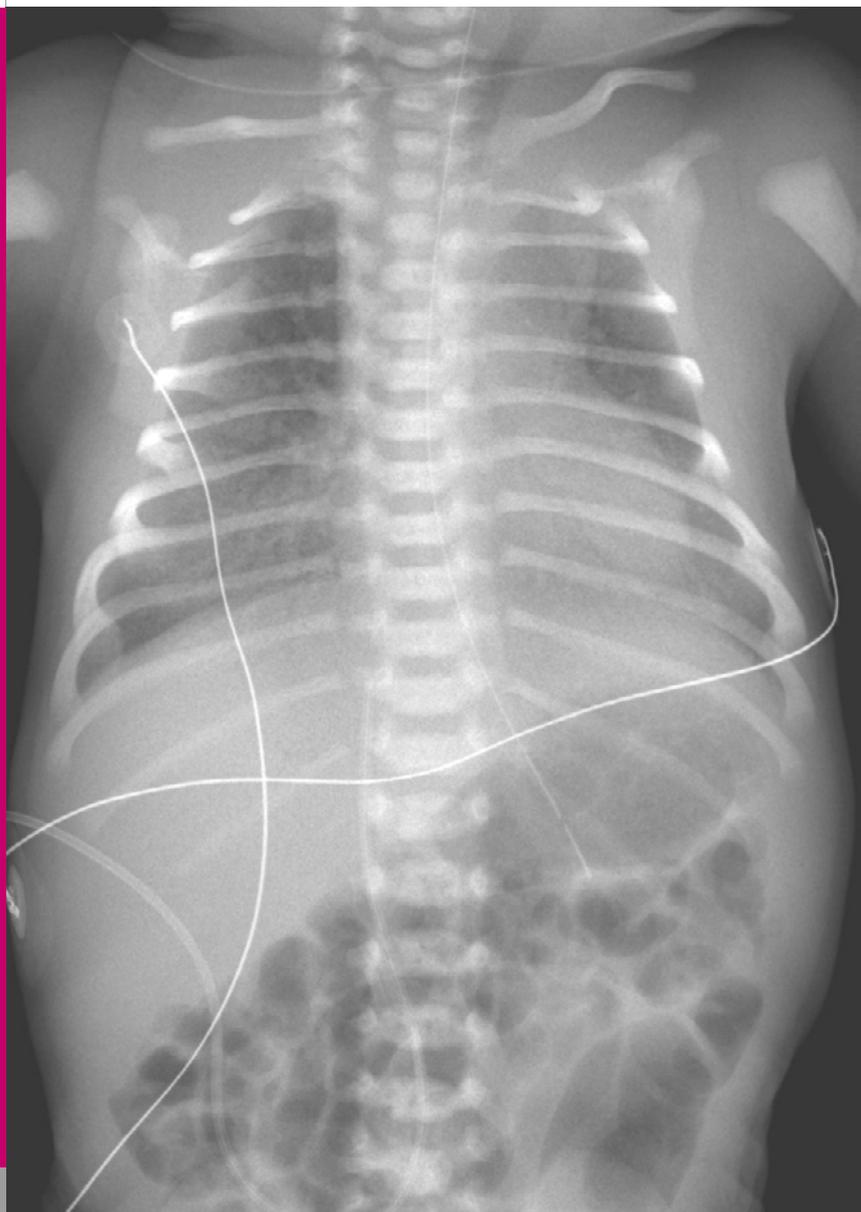
## CASE REPORT

A full-term male infant weighing 3540 g was born by vaginal delivery in our hospital via water birth. The mother was a healthy 35-year-old G5/P3. Pregnancy had been uneventful except for gestational diabetes, which was diet controlled. She had gone into spontaneous labor at 38 weeks' gestation. The membranes had ruptured on admission and she had started to have a few contractions. At this point, the mother opted for water birth.

After a quick first stage, with continuous CTG monitoring, labor progressed uneventfully, maternal and fetal observations were normal and no signs of fetal distress were evident. The baby's body was delivered within 3 min of delivery of the head. The baby was brought to the surface of the water, face uppermost, immediately following delivery.

Adaptation was unproblematic with Apgar scores of 8, 9 and 10 at 1, 5 and 10 minutes, respectively. At this point there were no signs of respiratory distress. However, 2 hours later, the newborn was noted to be tachypneic and grunting with an oxygen saturation between 83 % and 91 % on room air (video 1).

The baby was admitted to the neonatology unit and started on high-flow therapy. A partial septic work-up was done, and intravenous antibiotics were started.



**Fig. 1**

*Chest X-ray on DOL 1: bilateral interstitial and alveolar edema, findings felt to be consistent with water aspiration.*

A chest X-ray (CXR) done soon after admission demonstrated bilateral interstitial and alveolar oedema consistent with aspiration pneumonia (Fig. 1). Blood gas showed mild respiratory acidosis. Serum sodium concentration was normal.

After 3 days of high-flow nasal cannula therapy, the respiratory status had improved (video 2). Antibiotics were discontinued after 72 hours when blood cultures remained negative. Based on the history, clinical signs and symptoms, CXR appearance, and clinical response to non-invasive respiratory support, a diagnosis of water aspiration syndrome was made. The infant made a full recovery and was discharged home on day of life 9.

## DISCUSSION

Water birth has become a popular mode of delivery since the 1990s because it appears to be associated with a shorter first stage of labor, a lower episiotomy rate, and reduced analgesic requirements when compared with other modes of delivery (3).

Results from a prospective observational study by Geissbuehler et al. (4) that compared 3'617 waterbirths with 5'901 landbirths showed no increases in perinatal morbidity and mortality.

Gilbert and Tookey reviewed 4'032 water deliveries in England and Wales (5); no deaths were attributed to delivery in water. However, 35/4'032 (0.8 %) neonates required special care admission for within 48 h of delivery. Of these, 13 required respiratory support (mechanical ventilation, continuous positive airways pressure or headbox oxygen), and 15 had lower respiratory tract problems including pneumonia, transient tachypnoea of the newborn, suspected meconium or water aspiration syndromes, and freshwater near-drowning (one was hyponatremic). Moderate or severe hypoxic ischemic encephalopathy or perinatal asphyxia was reported in five children.

A descriptive study by Carpenter that compared 14 waterbirths with 24 conventionally delivered babies admitted for respiratory distress after birth showed that waterbirth was associated with more severe degrees of respiratory morbidity (6). A randomized

controlled trial of 274 women showed a higher number of neonatal resuscitations in women immersed in water during the first stage of labor (7).

At our own centre, the number of elective water births has more than doubled over a 4-year-period from 2014 to the end of 2017 (Table 1).

In this period, only three (1.6 %) of the 189 neonates

	2014	2015	2016	2017
Total number of deliveries, n	1451	1639	1739	1930
Waterbirths, n (%)	32 (2.2)	36 (2.1)	53 (3.0)	68 (3.5)

Number of waterbirths at the Cantonal Hospital of St. Gallen from 2014 – 2017).

born by planned water birth required admission to the neonatal unit within 24 hours of delivery. Of these, two were infants with signs of respiratory distress (one being the presented case) and one was born with trisomy 21 that had not been known before birth.

A recent study from North America by Bovbjerg et al. (8) used data from the Midwives Alliance of North America Statistics Project, birth years 2004 to 2009, and compared outcomes of neonates born under water (waterbirth, n=6'534), neonates not born underwater (non-waterbirth, n=10'290), and neo-

nates whose mothers intended a waterbirth but did not have one (intended waterbirth,  $n=1'573$ ). Neonatal outcomes included a 5-minute Apgar score of less than 7, neonatal hospital transfer, and hospitalization or neonatal intensive care unit (NICU) admission in the first 6 weeks of life. They found that waterbirth neonates experienced fewer negative outcomes than non-waterbirth neonates: the adjusted odds ratio (aOR) for hospital transfer was 0.46 (95 % confidence interval [CI], 0.32–0.68;  $P < .001$ ); the aOR for infant hospitalization in the first 6 weeks was 0.75 (95 % CI, 0.63–0.88;  $P < .001$ ); and the aOR for NICU admission was 0.59 (95 % CI, 0.46–0.76;  $P < .001$ ). For women, waterbirth (compared to non-waterbirth) was associated with fewer postpartum transfers (aOR, 0.65; 95 % CI, 0.50–0.84;  $P = .001$ ) and hospitalizations in the first 6 weeks (aOR, 0.72; 95 % CI, 0.59–0.87;  $P < 0.001$ ) but with an increased odds of genital tract trauma (aOR, 1.11; 95 % CI, 1.04–1.18;  $P = .002$ ).

The present case report and literature reviews remind us that, even after careful patient selection and even though most studies show no increases in perinatal morbidity and mortality, water birth can occasionally be associated with potential risks for the newborn.

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