A 19-year-old at 37 weeks gestation with an acute acetylsalicylic acid overdose

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A 19-year-old at 37 weeks gestation with an acute acetylsalicylic acid overdose

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Case Report

A 19-year-old, gravida 1, para 0 woman at 37 weeks gestation with an acute acetylsalicylic acid (ASA) overdose was brought to our institution with bloody emesis and tinnitus. The patient was initially limp and apneic with thick meconium-stained fluid. Arterial and venous cord gases drawn immediately after delivery were pH 7.32, CO2 43.6 mmHg, base excess -4 and pH 7.36, CO2 36.6 mmHg, and base excess -4.3, respectively. A salicylate level also drawn at this time was 33.5 mg/dL, while a level drawn simultaneously from the mother was 27.06 mg/dL. Initial complete blood count was hemoglobin 13.6 mmol/L, hematocrit 40.3%, platelets 285 000/mm3, PT 26.5, PTT 487 000/mm3. The patient remained confused and agitated and continued to complain of tinnitus. A series of her serum salicylate levels is shown in Figure 1.

As the threshold for hemodialysis for aspirin overdose at our institution is a serum salicylate level of 100 mg/dL, the patient was determined not to be a candidate for hemodialysis. Her serum salicylate level continued to decrease with intravenous fluids and bicarbonate therapy. A fetal ultrasound indicated a gestational age of 37–38 weeks (by fetal biparietal diameter and femur length). The fetal heart tracing showed a baseline fetal heart rate of 160–170 beats/minute with minimal variability and multiple spontaneous decelerations. The patient’s medical and mental status continued to improve. She also began to contract regularly, with cervical change to 3 cm dilation, consistent with early labor. The fetal heart tracing continued to be non-reassuring. Given the non-reassuring fetal heart tracing and the signs that the patient was entering early labor, she was extensively counseled as to the risks and benefits of a Cesarean delivery for both herself and the fetus and she consented to the procedure. To minimize risk of maternal hemorrhage, she was given a platelet transfusion prior to transfer to the operating room. A second unit of platelets was also started as the patient was taken to the operating room for an emergent Cesarean section under general anesthesia. A vertical skin incision, rather than a Pfannenstiel incision, was used to decrease the bleeding risk. Thick meconium was noted at the time of delivery, but the procedure was otherwise uncomplicated. Blood loss was estimated at 700 cc.

The female neonate weighed 3100 g at delivery and was initially limp and apneic with thick meconium-stained fluid. Apgars were 1 and 7 at 0 and 5 min, respectively. The initial heart rate was <60 beats/minute and chest compressions were not performed; the neonate was subsequently intubated. Arterial and venous cord gases drawn immediately after delivery were pH 7.32, CO2 43.6 mmHg, base excess -4 and pH 7.36, CO2 36.6 mmHg, and base excess -4.3, respectively. A salicylate level also drawn at this time was 33.5 mg/dL, while a level drawn simultaneously from the mother was 27.06 mg/dL. Initial complete blood count and coagulation studies at 1 h of life revealed a white blood cell count of 23 900 cells/mm3, hemoglobin 13.6 mmol/L, hematocrit 40.3%, platelets 285 000/mm3, PT 26.5, PTT...
Acute acetylsalicylic acid overdose at 37 gestational weeks showed no growth after 48 h. She was extubated in Table 1. The neonate did not pass a hearing test performed on day of life two; the results of further testing are unknown.

Discussion

There have been several prior reports of in utero salicylate toxicity, with three involving acute ingestion [1–3], two of which resulted in intrauterine fetal demise [2, 3]. The remaining cases involve chronic daily usage in the last trimester of pregnancy, and in two of such cases [4, 5], fetal or neonatal death was the result, one in utero [4] and one at day of life nine [5]. In several cases, the diagnosis of in utero salicylate exposure was made retrospectively and post-partum [1, 5–8]. In those cases in which salicylate exposure was known in the antepartum setting, the outcome was either intrauterine fetal demise [2–4] or Cesarean section due to fetal distress [9, 10], although the latter two cases involved chronic salicylate exposure during pregnancy rather than acute intoxication. The treatment in these cases of known in utero salicylate toxicity has largely been expectant management, with outcomes ranging from fetal demise in utero in the cases of large-volume ingestion [2–4] to delivery without sequelae, primarily in the cases of chronic ingestion [6, 7, 10, 11] although not exclusively [1]. Therefore, in acute maternal toxic salicylate ingestion, appropriate treatment is unclear, particularly whether or not dialysis or prompt delivery would be beneficial in preventing fetal demise in utero.

In adult patients, the threshold for hemodialysis to further counteract the effects of salicylates has been suggested at 70–80 μg/dL and 100 mg/dL at our institution. However, it has been noted that the severity of the intoxication does not always correlate with serum salicylate levels [13]. While neither our case nor prior cases have met these criteria, the three cases involving fetal demise in utero involved maternal salicylate levels in the 50–60 mg/dL range [3, 4], and it has been shown that fetal blood levels are ~1.5 times maternal levels [9, 11]. Furthermore, the neonate eliminates salicylate more slowly due to immature glucuronidation and renal excretory pathways [9, 11], and salicylate tends to concentrate in the fetal brain due to a smaller intravascular/intracellular pH gradient in the fetus [4]. The intracerebral accumulation of salicylates is a major cause of morbidity and mortality. This raises the question of whether dialysis should be initiated at lower levels in cases of salicylate toxicity in pregnancy, and if this might be beneficial for the fetus. In only one prior report was hemodialysis utilized [4], and this was initiated in a patient who presented after in utero fetal demise had already occurred.

To our knowledge, there have been no reports of the use of dialysis for toxic overdose of any drug in pregnant patients. There has been a study of acute kidney injury during pregnancy requiring dialysis [14], but fetal outcomes were not followed. In our case, a gravid patient presented with initial salicylate levels below those in prior case reports where significant morbidity or mortality was the outcome. Although the fetus showed signs of distress upon presentation, the decision was made to delay delivery until maternal status had been optimized. It was unclear whether the benefits of maternal hemodialysis would be conferred upon the fetus, as hemodialysis would have little effect on the salicylate that had already entered fetal circulation. In addition, fetal distress in this situation could be attributed to derangements in fetal acid–base status, as mentioned in previous case reports [4], with fetal acidosis persisting despite our patient’s alkalosis due to intravenous bicarbonate therapy. Indeed, it has been hypothesized that maternal hemodialysis does not benefit the fetus in the case of acute salicylate overdose and that emergent delivery is the most beneficial for the fetus at risk for in utero salicylate toxicity at or near term [4]. Maternal hemodialysis was not initiated in our case, with no adverse effect on fetal outcome. As shown in Figure 1, maternal salicylate levels, although higher than maternal levels, also declined spontaneously within 24 h of life.

As the patient’s condition stabilized without hemodialysis, she spontaneously began to labor and mode of delivery became a concern. The fetal heart tracing continued to show signs of fetal distress, and despite progressive cervical change, it was thought that the fetus would not tolerate a vaginal delivery. As salicylate metabolites accumulate in the fetal brain [5], potentially fatal intracerebral hemorrhage could result, as has been reported in other cases.

Fig. 1. Maternal and neonatal acetylsalicylic acid levels over time.
Given these concerns for fetal well-being, a Cesarean section was determined to be the optimal mode of delivery. Our experience with this case and further research on similar situations illustrates that maternal hemodialysis is of little benefit to the fetus in cases of salicylate ingestion and that expectant management is reasonable until maternal condition stabilizes, at which time, the patient should be counseled for a Cesarean section to avoid fatal fetal intracerebral hemorrhage.

Conflict of interest statement. None declared.

References


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