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

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Case Report

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

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Abstract

Acute salicylate overdose in pregnancy is potentially fatal for both the mother and fetus and presents a unique challenge in intensive care management. While suggested thresholds exist for hemodialysis in adults with toxic salicylate ingestion, it is unclear if these thresholds remain appropriate for the gravid patient, particularly given that medications such as acetylsalicylic acid may cross the placental barrier and accumulate in the fetal bloodstream. We describe a case of a gravid patient at 37 weeks gestational age with a self-reported acetylsalicylic acid ingestion of 32.5 g and review prior cases of both acute and chronic salicylate ingestion in pregnancy in order to determine the clinical precedent for hemodialysis in this situation.

Keywords: acetylsalicylic acid; hemodialysis; overdose; pregnancy; salicylate toxicity

Case report

A 19-year-old, gravida 1, para 0 woman at 37 weeks gestation with a past medical history notable for mild mental retardation, bipolar disorder and hypothyroidism presented to an outside hospital with bloody emesis and tinnitus after a self-reported ingestion of 100 tablets (32.5 g) of aspirin several hours prior. Upon initial presentation, she was agitated and tachypneic, with a respiratory rate of 40 breaths/minute and tachycardic, with a heart rate of 120–130 beats/minute, but otherwise hemodynamically stable. Her laboratory data were notable for a salicylate level of 32.5 mg/dL, bicarbonate of 16 mmol/L and an anion gap of 14. An ultrasound showed a fetal heart rate of 160–170 beats/minute. The patient was given bicarbonate and glucose and transferred to the medical intensive care unit, where she was continued on a bicarbonate drip for urine alkalinization. A repeat salicylate level was 41.69 mg/dL with an arterial pH of 7.60. She remained persistently alkalotic due to the bicarbonate drip. Coagulation studies, including prothrombin time (PT), activated partial thromboplastin time (PTT) and international normalized ratio (INR), were all within normal limits. Her hematocrit was 37% and platelets were 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
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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 tri-
semester 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 intox-
ication. The treatment in these cases of known in utero sali-
cylate 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 fur-
ther counteract the effects of salicylates has been suggested
at 70–80 [12] 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 mater-
nal 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 out-
comes 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
ferred upon the fetus, as hemodialysis would have little
effect on the salicylate that had already entered fetal circu-
lation. 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, neonatal salicylate levels, although
higher than maternal levels, also declined spontaneously
within 24 h of life.

As the patient’s condition stabilized without hemodial-
ysis, she spontaneously began to labor and mode of deliv-
ery became a concern. The fetal heart tracing continued to
show signs of fetal distress, and despite progressive cervi-
cal 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


Received for publication: 8.6.11; Accepted in revised form: 26.7.11