SPONTANEOUS GASTRIC RUPTURE IN THE PERI-DELIVERY PERIOD

SŁAWOMIR STRZELCZYK1, LESZEK SUŁKOWSKI1, MARZENA PĘCZAK2

Department of General and Vascular Surgery with Polytrauma Sub-Department, Regional Specialistic Hospital in Częstochowa1
Ordynator: lek. S. Strzelczyk
Department of Emergency Medicine, Regional Specialistic Hospital in Częstochowa2
Ordynator: lek. P. Stryjewski

The case of a young primigravida pregnant women with spontaneous gastric rupture in perinatal period was reported. Rapid obstetric intervention during caesarean section made possible the survival of the neonate. Prompt surgical laparotomy was performed with excision necrosis part of the stomach wall. The wall was repaired what gave the positive therapeutic effect. Authors indicate on diagnostic troubles, the way of obstetric and surgical treatment and complications in postoperative course.

Key words: pregnancy, spontaneous gastric rupture

Complications of pregnancy, especially of peri-delivery period, are sometimes very dramatic. They can be life threatening both for the mother and the child. Spontaneous gastric rupture occurs very rarely. The literature indicates high maternal and newborn mortality (1, 2, 3). The diagnosis is made after delivery or during autopsy. As literature indicates, the case reported here is the first published case report when both mother and child survived.

CASE REPORT

A female patient D.K., age 23, was admitted to the Department of Pathological Pregnancy of Regional Specialistic Hospital in Częstochowa in 36th week of pregnancy due to continuous, mild pain of the whole abdomen. The complaints that were occurring since several hours, had been preceded by severe vomiting after consumption of a large, heavy meal on the day preceding her admission to the hospital.

During pregnancy the patient regularly attended medical visits and no abnormalities were detected during these examinations. Ultrasonographic assessment of the fetus performed at 20th week of the pregnancy was unremarkable. 50 g glucose loading test and indirect antiglobulin test were normal. WR and HbsAg were negative. The patient reported that her father was diabetic.

At the hospital admission: the patient’s blood pressure was 130/90 mm Hg, her pulse was slightly accelerated – approximately 100/min. Physical examination revealed: abdominal walls were tense with glossy skin, body of the uterus was difficult to assess, reaching approximately 3 cm below the xiphoid process, not tender upon palpation. Transvaginal obstetric assessment demonstrated presenting head, mobile over the entrance, completely eliminated uterine cervix with opening for approximately 3 cm. Amniotic sac was demonstrated, with clear and clean amniotic fluid seen over the amniotic wall. Small amount of blood stained mucus in the vagina. Vaginal swab was taken (Streptococcus agalactiae, Gardnerella vaginalis). Since there were difficulties in obtaining the fetal pulse, the patient was immediately referred
for ultrasound examination that revealed longitudinal cephalic presentation with the face located under the pubic symphysis. The fetal heart rate (FHR) was 146 bpm, regular, umbilical artery flow was: PI=0.7 RI=0.45. Since there were difficulties in biometric assessment of the fetus due to low ultrasound transparency, the measurements were not done.

The patient was transferred to the delivery room to undergo continuous cardiotocographic monitoring. Periodic variable FHR decelerations to 80 bpm were recorded during a 30-minute monitoring. The tension of abdominal wall precluded obtaining a correct tocographic signal and precise identification of abnormalities of the fetal pulse. Due to recurrent decelerations of the fetal pulse, increased tension of the abdominal wall (peritonism), with the diagnosis of threatening fetal distress syndrome and suspected unidentified obstetric pathology, the patient was referred, after obtaining her consent, for immediate Cesarean section.

Biochemistry: Na 136 mmol/l, K 3.67 mol/l, Cl 104 mmol/l, urea 24 mg%, creatinine 1.07 mg%, total protein 5.8%, CRP 13.48 mg/l, AST 32U/l, ALT 20U/l, Hgb 15.2 g%, Hct 47.7%, RBC 4 820 000, WBC 23 600, PLT 219 000.

The abdominal cavity was opened with Pfannenstiel section. When the peritoneum was opened, an odorless gas evacuated through the formed hole; large amounts of dark brown fluid with small fluffs indicating probably food remnants (acidic pH of the fluid) were observed in the abdominal cavity. The surface of the intestines and peritoneum was congested, indicating the onset of the inflammatory process. Perforation of the upper gastrointestinal tract was diagnosed and surgical consultation was requested. During the procedure antibiotics were administered and 2500 units of heparin. The fluid from the abdominal cavity was largely drained, upper gastrointestinal tract was secured and Cesarean section was continued: male fetus was delivered. A sample of fetal blood was taken for blood gases analysis. After the uterus was sutured and surgical field was inspected, a drain was placed in the Douglas cavity. Abdominal wall was sutured and second stage of the surgical procedure was undertaken.

To obtain better access to the upper portion of the abdominal cavity and to limit the cut, a decision was taken to proceed with a section in the midline between the umbilicus and the xiphoid. During laparotomy an extensive necrosis (area 25 cm²) of the anterior wall and fundus of the stomach with perforation, was found. No hiatal hernia was found. Partial resection of the anterior wall and fundus of the stomach in the area of healthy tissues, was performed and gastoplasty was performed. Swabs were taken for bacterial culture (no growth). Abdominal cavity was flushed with large amounts of isotonic saline, two drains were placed in the abdominal cavity and abdominal wall was sutured in layers. The afterbirth and gastric specimen were referred for pathological examination (test results: placenta – hyperemia, umbilical cord – acute angiothrombosis, amniotic membrane – edema, gastric specimen – diffuse hemorrhagic necrosis). The patient was transferred to the Intensive Care Unit at the same hospital.

The treatment was continued: mechanical ventilation with oxygen therapy, antibiotic therapy, anti-shock treatment and anti-hemorrhagic treatment plus protein and clotting factors (AT III – 47.2%) deficiencies were corrected. The patient had borderline efficient circulation: BP 105/60 mm Hg, pulse 140 bpm. Right pneumothorax resulted during placement of a catheter to a central vein that was trained and active drainage was used.

Over the next few days the patient developed fever up to 38°C. Mechanical ventilation was maintained and hypothermy was used. Peristalsis was restored on day 3 after the surgery. The feeding (initially fluids) was started on day 4 after the surgery and the patient was extubated. Her laboratory parameters were as follows: Hgb 7.1 g%; 12.4 g%, Hct 21.6; 33.9%, RBC 2 150 000; 3 650 000, WBC 15 700; 8900, PLT 126 000; 224 000, antithrombin III 47.2%; 78.5%, APTT 90.1s; 34.1s, D-dimers 3.16 µg/ml, fibrinogen 541 mg%, amylase 174 U/l, alkaline phosphatase 44 U/l, glucose 89 mg%, bilirubin 0.9 mg%. Cultures of material taken from the vagina, drain, airways, pleural cavity were sterile.

Further postoperative period was complicated by high fever up to 39°C and suppuration of postoperative wounds. Imaging studies were performed: several abdominal US examinations, US of the pleural cavities, pelvis minor, abdominal computed tomography and pelvis minor. Local treatments and therapy with broad spectrum antibiotics was used. Over the next days the patient’s fever decreased and her general condition improved. The patient was discharged home on day 28 of hospitalization in good general condition.
Follow-up gastroscopy performed 3 months after the surgery did not demonstrate any discernible changes in the stomach. Gynecological follow-up performed 3 and 6 months after the discharge from hospital confirmed normal gynecological condition of the patient.

Neonate

Male neonate, with birth weight 2900 g and Apgar scores 3/4/7/8, had the following results of blood gases examination in the blood obtained from the umbilical cord: pH 6.88, pCO₂ 108 mm Hg, PO₂ 11 mm Hg, BE 15.9 mmol/l, O₂ sat 8.3%. After drainage of mucus from the upper airways, he was ventilated with Ambu bag. His condition stabilized within 5 minutes. 49 minutes after the delivery, follow-up blood gases examination in the arterial blood was performed: pH 7.306, pCO₂ 26.1 mm Hg, PO₂ 242.7 mm Hg, BE 11.6 mmol/l, O₂ 99.8%. He was transferred to an incubator with atmosphere supplemented with oxygen. Transfontanellar imaging was performed twice and did not demonstrate any pathological changes in the CNS. No significant abnormalities were detected over the next several days. According to the patient, the infant’s health and his psychomotor development is normal.

DISCUSSION

The cases of spontaneous rupture of the upper gastrointestinal tract are extremely rare. There are several dozens of such cases, not associated with pregnancy, reported in the literature. Increased intragastric pressure related to its dilation as well as increased intraabdominal pressure are the most common mechanisms leading to spontaneous gastric rupture. Function of gastroesophageal junction and pyloric valves is an important factor for the regulation of gastric emptying. The first factor leading to increased intragastric pressure is dilation of its walls following sudden consumption of large quantities of food.

Historic studies by Revilliod from 1885 indicate that the stomach has enormous capacity. Gastric rupture due to overfilling could occur only after a rapid filling of a stomach with 4 liters of fluid. Furthermore it may lead to functional impairment of gastric cardia that lets through the alimentary contents only in one direction – to the stomach. Congenital hiatal hernia may have detrimental effect on the gastric cardia; high position of the diaphragm (which is typical for advanced pregnancy) (1, 2), severe vomiting that result from cough, gastric dilation caused by drug-induced gases as well as gastric pumping through a probe. High level of uterine fundus placement that compresses the stomach and increases intragastric pressure, is an additional complicating factor during the pregnancy.

Vomiting is a significant contributing factor in Mallory-Weiss syndrome, causing longitudinal cracks in the gastric mucosa near the cardia. The above mentioned cracks may penetrate into the muscular layer. Sometimes vomiting may lead to the rupture of the distal esophagus (Boerhaave syndrome). The difference is that the esophageal rupture occurs during vomiting with gastric contents while gastric rupture occurs during nausea and vomiting reflexes (4). Pathogenesis of gastric rupture is believed to involve arterial ischemia of the gastric wall despite its excellent blood supply (4). Inflammation of the gastric mucosa which often is not noticed by the patients, is also a significant factor here. Trauma, e.g. indirect cardiac massage or chest thump, is the last of the factors leading to gastric rupture (2, 3, 5).

In our case, the gastric rupture could have been caused by several factors. The process has been initiated by an excessively large meal that caused nausea and vomiting. High position of the diaphragm intensified activity of the valve closing the gastric cardia. Compression of the stomach by the uterine fundus increased intragastric pressure and impaired gastric emptying. The probable inflammation of the gastric mucosa decreased resistance of its walls. Increased intragastric pressure, location of the perforation in the area of gastric fundus and extensity of the perforation as well as the result of pathological examination (gastric specimen – diffuse hemorrhagic necrosis) indicates a possibility of ischemic perforation of the gastric wall.

Significant diagnostic difficulties in this rare complication (vague clinical symptoms, unclear US result) led to the fact that the decision to deliver the pregnancy was guided predominantly by the condition of the fetus and the diagnosis was made only after opening of the abdominal cavity. In all publications authors indicate that the complication is diagnosed during laparotomy (1, 4, 6). Clinical diagnosis in these cases is difficult due to: lack of symptoms, noncharacteristic symptoms that can be mistaken for pregnancy-related complaints and
Spontaneous gastric rupture in the peri-delivery period

in the peri-delivery period they can be masked by the delivery in progress.

In our case, the patient underwent Cesarean section at the first stage and then a damaged stomach was repaired using a separate section. Such management conforms with the literature data: authors emphasize that decreased volume of the uterus allows for easy insight into the abdominal cavity and repair of the damage (7). Furthermore, two relatively small sections limited the possibility of spread of the inflammation.

All publications emphasize severe postoperative course of the disease. Anti-shock, anti-hemorrhagic, anti-thrombotic management and broad spectrum antibiotic therapy is required (1, 2, 4, 6). The complications can sometimes be very dramatic, including acute pancreatitis, coronary artery thrombosis, dissecting aneurysm of the aorta or severe renal failure and circulatory failure (2, 4).

The above mentioned case required special management from the very beginning. Due to the puerperium, intensive antibiotic therapy in combination with antithrombotic therapy was used from the very beginning. Septic state caused by peritonitis was observed during the first few days after the surgery. The indices of inflammation again increased on day 12 after the surgery, which suggested presence of suppurative foci in the peritoneum, confirmed in the abdominal computed tomography. Careful monitoring of the patient’s condition prevented further complications from developing.

The reported cases of spontaneous gastric rupture in pregnant women were universally fatal for fetuses. Authors indicate that it may have resulted from lack of tolerance of stress related to rapid delivery in combination with significant decrease of uterine-placental flow resulting from hypovolemia in the mother. Fetal immaturity was a significant contributing factor (1, 6). Results of pathological examination of umbilical vessels indicate that, in the reported case, the cause may have been vessel thrombosis of unknown etiology.

The decision to deliver the neonate was prompted by concerns for his well-being. Dramatically low blood gases did not correlate with the clinical condition of the neonate that predicted good prognosis. Maybe the puncture of the umbilical cord “contaminated” with an acidic peritoneal fluid influenced the results. Repeated examination of blood gases, performed after 49 minutes, was normal. Observation of the neonate during his hospitalization in the Department of Neonatology, did not indicate any abnormalities.

CONCLUSIONS

A case of spontaneous gastric rupture in the 36th week of pregnancy is the only reported case that resulted in delivery of an alive, healthy child and saving mother’s life. Furthermore it demonstrates possibilities of modern medicine. Due to prompt Cesarean section, immediate diagnosis and surgical repair as well as proper treatment in the postoperative period, both mother and child were saved. Enormously high mortality reported among fetuses and pregnant women with this complication indicates that success of the treatment of such complicated cases depends on the speed of action and ideal cooperation between a gynecologist, anesthesiologist and neonatologist.

REFERENCES

Obstetric issues in the abdominal surgery concern pregnant women, parturients and women in puerparium with surgical diseases of the abdomen that require urgent or elective surgical intervention, often due to life-threatening condition. Due to systemic changes and local, anatomic abdominal changes, diagnostic evaluation in more difficult in such cases than in non-pregnant and non-puerparium women and treatment, in particular surgical treatment, poses additional problems related to evaluation of the condition of pregnancy and development of the fetus. Clearly pregnancy and puerparium make conventional medial diagnostic and therapeutic activities, and in particular surgical treatment, significantly more difficult. The surgical risk when surgical pathologies coexist with pregnancy is more than high (1). The incidence of so called surgical diseases of the abdomen in pregnant women is not higher than in non-pregnant women. However, the inflammatory process in a pregnant women is more dynamic and in the second half of the pregnancy, peritoneal signs are masked and often have atypical location, which is related to changes in topography in a women with advanced pregnancy that involve separation of intestines from the abdominal wall by a huge pregnant corpus of the uterus that makes palpation of internal organs difficult. The bigger and more advanced the pregnancy is, the more difficult the examination becomes. Peritonitis of surgical origin may occur during pregnancy and puerparium just as it occurs in non-pregnant women, as acute disease originating from one of the abdominal organs, requiring adequate surgical intervention.

The Authors present a case of spontaneous gastric rupture in 36th week of pregnancy. Due to Cesarean section and surgical repair of gastric lesions and proper postoperative treatment, both mother and child were saved. However, possibility of another surgical approach should be considered. I believe that midline section, passing round the navel from the left or right, would be more appropriate in this case. Such management provides precise observation of the whole abdominal cavity.

REFERENCES