

Report of a case of liver rupture in preeclampsia and HELLP syndrome

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Abstract

Liver rupture secondary to preeclampsia represents a complication that, if is not recognized early, can be fatal. Its presentation is rare, but very complex to treat, having options that are not clearly protocolized and usually derive from the experience of the surgeon who faces it. We present a case of liver rupture of a patient from Toluca, State of Mexico who was admitted by emergency air transfer with immediate puerperium complicated by severe preeclampsia, postpartum hemorrhage, liver rupture with hemodynamic instability, it was necessary to intervene surgically for a total of seven occasions to control the hemorrhage, as well as pharmacological, medical measures and multiple transfusions; however, she died on the eighteenth day of his hospitalization for septic shock.

Keywords: Preeclampsia. HELLP syndrome. Liver rupture.

Introduction

Liver rupture can occur due to different etiologies during pregnancy, including tumors, traumatic causes, and secondary rupture due to severe preeclampsia¹, cases of rupture without any identifiable pathology are exceptional². Some cases have been reported where only subcapsular hematoma is present, without total rupture, in which there is a less severe evolution^{3,4} also, there is cases reported where there is only rupture of the hepatic capsule but complicated with necrosis and fulminant liver failure with subsequent multi-organ deterioration mainly cerebral and pulmonary⁵. However, its clinical presentation is usually catastrophic⁶. The frequency of presentation varies from one in 45,000 to one in 250,000 pregnancies complicated by liver rupture^{7,8}. In Mexico, the most numerous case reports

were reported by Murillo and Hernández, a series of 79 patients from 1985 to 1999 in which a frequency of one in 128,927 births was documented⁹. Pathophysiology is usually explained by periportal hemorrhage, intravascular fibrin deposits, which cause sinusoidal obstruction, intrahepatic vascular congestion with increased tissue volume, ischemia, and tension rupture trapped with the hepatic capsule, of complicated preeclampsia with HELLP syndrome^{10,11}.

The treatment described for liver rupture goes from packing^{12,13}, selective hepatectomy¹⁴, patch use with omentum¹⁵, selective embolization with interventional radiology¹⁶, and liver transplantation in extreme cases¹⁷ generally, the combination of different techniques is more effective. Prognosis is variable, but usually fatal¹⁸ with mortality of 60-70% of reported cases¹⁹. Mortality

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may be higher if severe bleeding develops, shock state with liver necrosis and complications added to acute liver failure and others associated with the clinical phenomenon of preeclampsia²⁰.

Clinical cases

We present the case of a 23-year-old patient, with 4 h of immediate puerperium, send from Texcoco General Hospital, on air ambulance occurred on March 2022.

Anthropometrics: weight 50.0 kg, Size 1.53 m, BMI: 24.6 kg/m², Predicted weight 45.68 kg, Ideal theoretical weight 47.1 kg; Body surface area 1.53 m². Mestizo ethnic group.

Obstetric history: a previous pregnancy complicated by early onset preeclampsia.

Motive of hospital transfer was HELLP syndrome and liver rupture. Important, mention a previous pregnancy end by cesarean section, indicated by severe preeclampsia at 38 weeks of gestational age, with total remission in puerperium period. No history of chronic diseases. History of sudden onset 10 h of evolution of the following symptoms: intermittent frontal and temporal headache, intense 10/10, pain in the upper right abdominal quadrant, pulsatile and very intense 10/10, associated with noninvasive high blood pressure 170/120 mm Hg, severe preeclampsia, HELLP syndrome, integrated by lactate dehydrogenase 918 UI/L, GOT 121 UI/L, GPT 108 UI/L, platelets 90,000/mm³. Pregnancy of 25 weeks of gestational age, fetal death Cesarean section and damage control surgery was performed trans cesarean section (liver packing) in her unit of origin, transfer was made by air transport. She was received in Shock area with sedation based in propofol, and midazolam, invasive mechanical ventilation in volume controlled mode, shock state, hemoperitoneum detected by FAST ultrasound, and evidence of bleeding by drainage type Penrose, protocol for mass transfusion was started, stabilization with quality volume and vasopressor support, because she was in hypovolemic shock status with MAP of 35 mm Hg, meriting new damage control surgery.

In the first surgical intervention performed in this hospital unit, hepatic rupture of segments V, VI, VI, and VIII was found, requiring packaging and placement of MALA bag with open abdomen. She presented torpid evolution, requiring a total of six interventions, with five packings and finally definitive closure with total abdominal hysterectomy, right oophorectomy, due to data of endomyometritis and unilateral salpingoophoritis (Figs. 1-11). The patient developed hepatic-metabolic failure, circulatory,



Figure 1. First laparotomy.

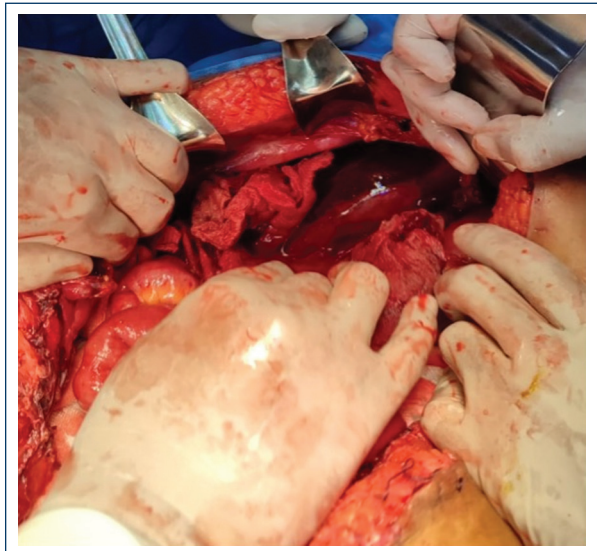


Figure 2. Second laparotomy.

renal, hematological, neurological failure, and septic shock (Tables 1-4). She was maintained with hemodynamic support, 18 days of mechanical ventilation, six renal sessions of hemodialysis, hematological (received total of 20 erythrocyte concentrates, seven platelet apheresis, 73 cryoprecipitates, 24 fresh frozen plasmas, 5 g of fibrinogen, 7000 mcg of recombinant factor VII, tranexamic acid 3 g), initially presented improvement of his state of coagulopathy, renal, hepatic, and circulatory failure between days 13 and 16 of hospitalization based on platelet values of 207,000/mm³, having previously

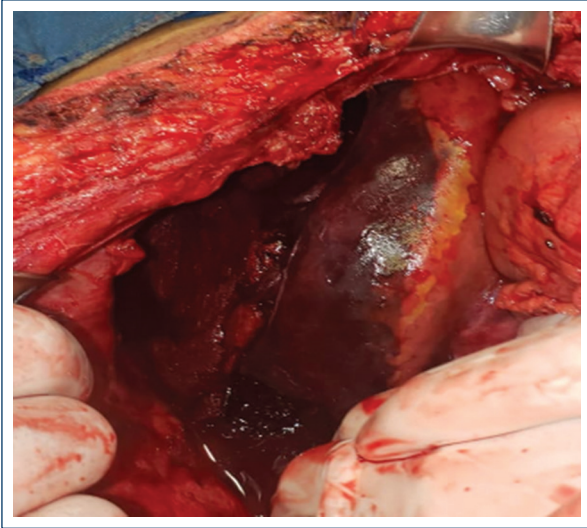


Figure 3. Third laparotomy.

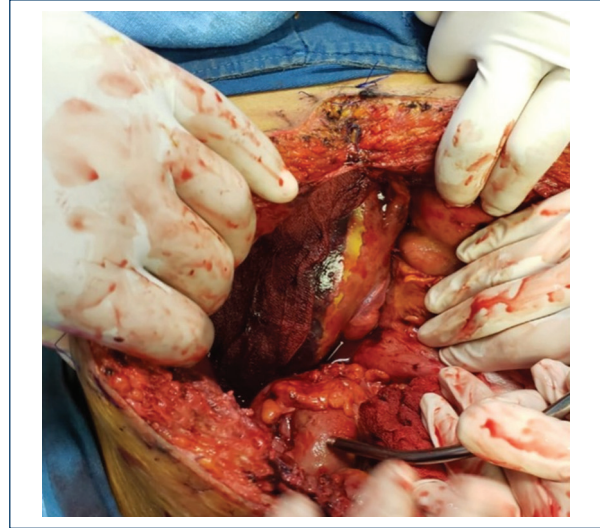


Figure 5. Fifth laparotomy.

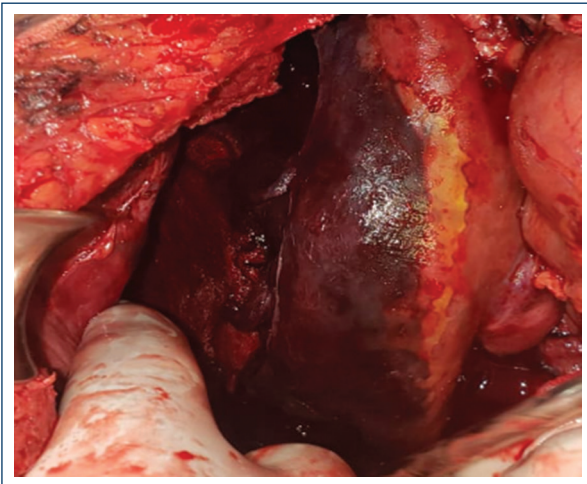


Figure 4. Fourth laparotomy.

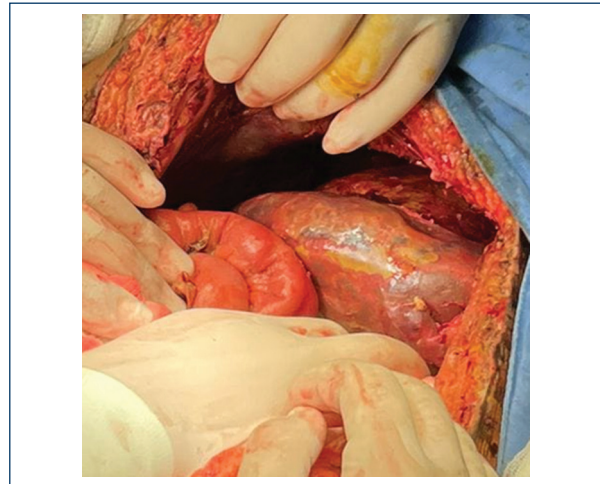


Figure 6. Sixth laparotomy.

been up to levels of 27,000/mm³, INR 1.39 previously reporting 1.88, hematocrit of 32.4%, with previous 20%, glucose controls of 85 to 140 mg/dL, with the previous hypoglycemia of up to 37 mg/dL, serum lactate 2 mmol/L, with previous 7-10 mmol/L. fibrinogen of 207 mg/dL, with previous up to 95 mg/dL. pH of 7.41, when previously presented acidemia with pH up to 7.2, bicarbonate of 22.9 mMol/L, with the previous of up to 16 mMol/L. creatinine of 1.5 mg/dL, with previous of up to 7 mg/dL. LDH of 515 IU/L, with preamps up to 10,813 IU/L, ast and ALT of 125 and 72 IU/L, with preamps up to 7000 IU/L both. Deterioration in her past 2 days of life with fatal outcome after 18 days of hospitalization with multi-organ failure induced by sepsis, demonstrated by result of

culture of blood sample with the same germ as in peritoneal culture and hemodynamic profile (systemic vascular resistance 549 dyna-sec/cm⁵ and increased cardiac output 12 L/min). *Enterococcus faecium* was isolated in peritoneal fluid culture and hematic sample, culture of bronchial secretions and urine were negative. Multidisciplinary treatment involved critical medicine, internal medicine, general surgery, anesthesiology, nephrology, infectiology, and nutrition staff.

Discussion

It has been documented since the nineties that liver rupture due to preeclampsia is a condition of very low

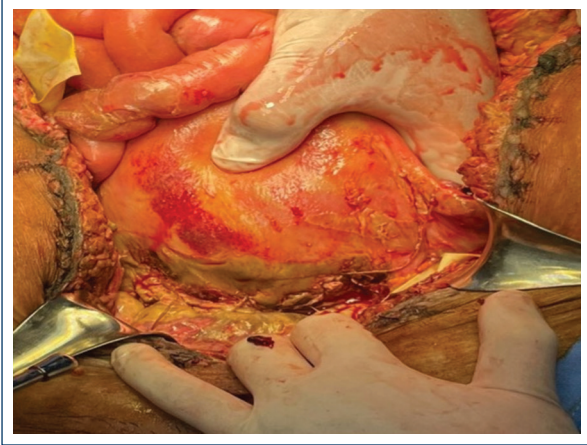


Figure 7. Uterus.

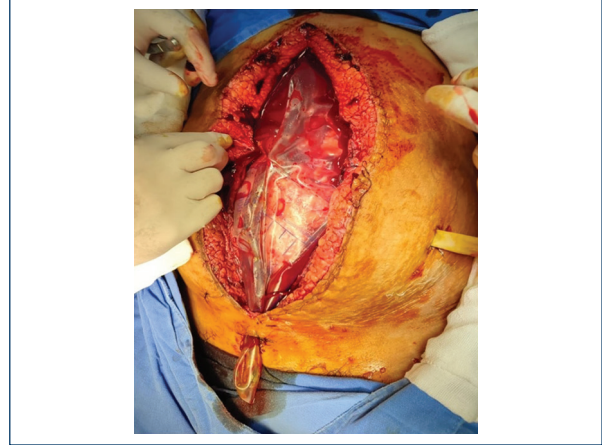


Figure 10. Use of MALA bag.



Figure 8. Uterus with necrosis.



Figure 11. MALA bag.



Figure 9. Uterus removed.

incidence but high mortality, as described in numerous clinical case reports above¹⁻⁶. This case is one of the few that have been documented in the world, since its incidence is very low, generally the reported cases are hematomas and not complete rupture⁷⁻⁹.

In the example mentioned, it initially evolved with severe hypertension and later with hemorrhagic shock, due to the massiveness of bleeding after liver rupture and consequent bleeding^{10,11}.

In the reported case, a damage control surgery protocol was made with six interventions in total, which were performed by the most trained personnel; however, there were some of the available options known in the literature, such as selective embolization, liver transplantation, interventional radiology measures, etc.¹²⁻¹⁷.

Table 1. Arterial gasometry results

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Ph	7.29	7.24	7.36	7.26	7.3	7.3	7.39	7.4	7.37	7.44	7.38	7.35	7.31	7.41	7.49	7.37	7.35	6.9
HCO ₃	17.2	16.9	19.5	19.4	21.1	21.7	16.7	20.7	21.1	21.1	19.6	20	21.8	22.9	22.6	22.3	20.7	6.7
PCO ₂	34.2	40	35.2	44	44	46	20	30	37	27	30	34	44	34	26	38	32	36
PO ₂	122	101	127	100	110	97	96	88	72	77	70	95	111	122	104	47	38	61
D base	8	9.4	4.8	7.8	5.1	2.4	12.2	6.2	5.3	4.9	7.4	6.9	4	3.1	3.5	3.3	5.2	25
Lactate	4	7	4	2	3	2	3	4	2	3	2	2	3	4	2	2	4	10

Source: Clinical record.

Table 2. Hematological results

Día	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
INR	1	1.33	1.66	1.88	1.85	1.59	1.63	1.55	1.59	1.59	1.5	1.59	1.55	1.44	1.39	1.49	1.43	1.59
PT	14	15.2	11.6	20.7	20.4	17.8	18.2	17.3	17.8	16.8	17.8	17.3	16.2	11.6	16.2	16.7	16.3	17
PTT	34	60	30	25	32.5	32.3	35.8	49.3	34.3	33.6	37.1	42	44	75.5	25.6	25.6	40.2	32.6
Hematocrit	37	31.5	25.7	25.7	23.1	22.9	21.6	25.1	29.1	29.5	21.6	30.6	32.4	31.5	19.1	21.6	34.7	31.3
Platelets	90	75	26	66	51	57	69	67	56	63	60	67	207	75	78	100	102	120
WBC	12	15.1	5	5.4	8.9	11.5	9.4	8	8.8	8.4	9.4	7.5	21.1	15.1	22.4	11.6	7.7	2.7

Source: Clinical record.

Table 3. Blood chemistry results

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Glucose	87	158	82	84	37	147	68	53	89	121	83	108	148	85	133	118	95	105
Creatinin	0.8	1.17	1.85	3.09	5.15	3.09	5.15	6	6.42	6.42	7.15	3.84	2.26	2.07	2.22	1.59	1.58	2.73
BUN	10	26	26	34	43	53	67	81	81	99	111	140	121	82	94	126	122	70
Urea	21	32	52	72.8	92	113	143.4	173	173	211	237	299	258	175	201	269	149	218
Bilirrubin	0.4	3.28	3.9	4.58	5.55	5.15	5.81	6.12	7.08	7.27	8.51	5	11.5	12.89	10.15	13.72	13.9	12.9
AST	121	1000	1000	6000	7336	2800	846	450	227	144	125	121	162	167	125	166	131	138
ALT	108	1100	1100	7000	4366	2524	881	398	229	130	87	80	80	72	72	66	97	11
LDH	918	1343	750	4500	10813	4500	1036	870	704	947	1250	886	860	515	663	652	690	688

Source: Clinical record.

However, due to the complications of concomitant preeclampsia, such as disseminated intravascular coagulation and the massive endothelial lesion developed, a series of events occurred that led to the need for multiple surgical reinterventions and with it the fear-some complication of intra-abdominal sepsis, which was finally the cause of her death, resulting similar to

that described in multiple case reports and literature reviews cited¹⁸⁻²⁰.

Conclusion

Liver rupture is a deadly complication of preeclampsia and represents a challenge for the surgeon facing

Table 4. Seric electrolytes

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Sodium	137	137	139	141	142	141	142	142	137	138	139	139	141	140	140	141	142	142
Potassium	6.3	6.13	7.18	7.18	6.26	6.47	6.19	6.19	7.65	6.78	6.57	5.1	4.6	4.26	4.78	4.77	4.77	4.53
Chlorine	108	106	107	108	108	107	108	106	106	106	107	103.37	108	109	108	108	104	103
Calcium	7.3	8.2	7.9	7.8	7.3	6.6	6.8	6.7	6.8	6.9	6.7	7.5	8.41	7.6	8.2	8.1	7.9	7.9

Source: Clinical record.

this clinical entity, as well as for the multidisciplinary team that performs the organic support during hospitalization in intensive care. The case of the patient presented had a fatal outcome; however, all possible medical and surgical interventions were performed, as well as multidisciplinary management of each of the organic failures that manifested themselves during the clinical course of her condition. Early detection of pre-eclampsia and its timely treatment can prevent such tragic and costly social and economic outcomes.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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