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External Manual Aortic Compression as a Temporizing Measure During Inter-Facility Transfer of a Woman With Life-Threatening Obstetric Hemorrhage in a Resource-Limited Setting: A Case Report From Ethiopia

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Case Report

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Abstract

Severe postpartum hemorrhage can be fatal when blood products, devices, and transfer are unavailable. External manual aortic compression (EMAC) may reduce distal blood flow temporarily. A 24-year-old woman at 37 weeks and 2 days presented after five hours of vaginal bleeding and developed shock following vaginal delivery, with blood loss exceeding 3,000 mL. Initial measures failed to control bleeding. Because the referring facility had neither blood products nor a non-pneumatic anti-shock garment, the attending gynecologist maintained EMAC for approximately 65 minutes during ambulance transfer. At the referral hospital, she received eight units of whole blood and three units of fresh frozen plasma and underwent B-Lynch uterine compression suturing. She developed acute kidney injury requiring three hemodialysis sessions. Renal function recovered, and she remained well through 12 months. This case illustrates EMAC as a temporary bridge to definitive treatment, not a substitute for urgent transfer, resuscitation, transfusion, or hemorrhage control.

1. Introduction

Postpartum hemorrhage (PPH) is a major cause of maternal morbidity and mortality. In resource-limited settings, delays in blood-product availability, surgery, monitoring, and inter-facility referral can worsen outcomes. Management requires prompt resuscitation, control of bleeding, and timely definitive treatment. [1, 2]

External manual aortic compression (EMAC) is a simple maneuver that can temporarily reduce distal arterial blood flow during severe obstetric hemorrhage. Disappearance of the femoral pulse is commonly used as a bedside indicator of effective compression. EMAC is not definitive treatment but may serve as a bridge while transfer or surgical care is arranged. [3–5]

We describe life-threatening obstetric hemorrhage in Ethiopia in which EMAC was maintained for approximately 65 minutes during transfer because the referring facility lacked blood products and a non-pneumatic anti-shock garment (NASG). The patient survived after transfusion, surgical hemorrhage control, and treatment of dialysis-requiring acute kidney injury (AKI). This single case cannot establish that EMAC alone caused survival.

2. Case Presentation

2.1 Presentation and Initial Management

A 24-year-old Ethiopian G3P2 woman at 37 weeks and 2 days of gestation, based on her last menstrual period, presented after approximately five hours of severe vaginal bleeding. No early pregnancy ultrasound was available. She had two previous vaginal deliveries. She collapsed at home and was initially assessed as having antepartum hemorrhage with suspected placental abruption.

On arrival, she was lethargic (Glasgow Coma Scale 14/15), with blood pressure 85/50 mmHg, pulse 120 beats/min, respiratory rate 28 breaths/min, oxygen saturation 89%, and temperature 36.1°C. Her abdomen was tetanically contracted and fetal heart activity was absent. Two large-bore intravenous lines were placed and resuscitation started. She delivered a 3,000-g stillborn fetus vaginally approximately 30 minutes later; the placenta detached and delivered spontaneously.

The uterus was atonic after delivery, with estimated blood loss exceeding 3,000 mL. Intrauterine tamponade using an 18-Fr catheter inflated with 80 mL normal saline did not control bleeding. Her peripheral pulses became feeble and blood pressure was unrecordable.

2.2 External Manual Aortic Compression During Transfer

Active management of the third stage and the tamponade attempt were unsuccessful during the first approximately 15 minutes after delivery. Bimanual uterine compression was then maintained for about 15 minutes while transfer was arranged. The referring facility had no blood products or NASG, and definitive surgery was unavailable.

The maneuver is illustrated in Fig. 1. EMAC was maintained during ambulance transfer because blood products and NASG were unavailable at the referring facility.

The attending gynecologist initiated EMAC after the patient was placed supine in the ambulance. Using the clenched knuckles of the dominant hand, the clinician applied firm downward pressure over the abdomen near the umbilicus to compress the aorta against the vertebral column. The non-dominant hand palpated the femoral pulse; disappearance of the pulse was used to assess compression.

EMAC continued for approximately 65 minutes during the journey to the general hospital. Continuous blood-pressure monitoring was not possible because the gynecologist was alone with the ambulance driver.

2.3 Definitive Management at the Referral Hospital

Transfer took approximately one hour. At the referral hospital, blood grouping and cross-matching were performed and transfusion started. She received eight units of whole blood and three units of fresh frozen plasma; platelets and cryoprecipitate were unavailable.

A B-Lynch uterine compression suture controlled the hemorrhage. Hematocrit increased from 3% before transfusion to 28% afterward. She had delayed awakening, was admitted to intensive care, and began ambulating approximately 10 hours after the procedure.

2.4 Acute Kidney Injury and Dialysis

Approximately 24 hours after presentation, she developed severe AKI, with creatinine reaching 13.2 mg/dL and anuria lasting approximately 48 hours. She was transferred to a comprehensive specialized hospital and received three hemodialysis sessions. Creatinine decreased to 1.1 mg/dL after dialysis, and she was discharged after clinical improvement.

2.5 Follow-up

At one and two weeks, urine output was normal, with no recurrent bleeding, urinary symptoms, significant pelvic pain, or major complications. By four and six weeks, she had resumed usual daily activities and had not required further dialysis or readmission.

At two months, creatinine was 1.0 mg/dL. Renal function and urine output remained normal at three, six, and 12 months, with no recurrent kidney dysfunction or further renal replacement therapy. No significant abnormal uterine bleeding or persistent pelvic symptoms were reported.

3. Timeline

Time	Clinical event
~ 5 hours before presentation	Severe vaginal bleeding began; patient collapsed at home.
Arrival	Lethargic; BP 85/50 mmHg, pulse 120/min, RR 28/min, SpO2 89%, temperature 36.1°C, GCS 14/15; fetal heart beat negative.
Initial management	Two large bore IV lines established and rapid resuscitation initiated.
~ 30 minutes	Vaginal delivery of a 3-kg fetus with no signs of life; placenta delivered spontaneously.
Immediately after delivery	Severe ongoing hemorrhage; estimated blood loss > 3,000 mL.
First ~ 15 minutes after delivery	Active management of third stage and intrauterine tamponade attempt using 18-Fr catheter with 80 mL normal saline.
Next ~ 15 minutes	Bimanual uterine compression while referral and transfer were arranged.
Ambulance transfer	EMAC initiated and maintained for approximately 65 minutes; femoral pulse disappearance was noted to assess effective aortic compression.
~ 1 hour after departure	Arrival at the nearest General Hospital; laboratory assessment, cross-matching and transfusion initiation.
Definitive treatment	B-Lynch uterine compression suture performed under General Anesthesia; hemorrhage controlled.
Postoperative period	Delayed awakening; ICU care; Recovery and started ambulation approximately 10 hours after ICU admission.
~ 24 hours	Severe AKI developed; creatinine 10.1 mg/dL.
~ 48 hours	Anuria persisted for approximately 48 hours, Cr become 13.2mg/dl.
Subsequent days	Transferred to the nearest Comprehensive Specialized Hospital and received three dialysis sessions.
After completing dialysis sessions	Final Serum creatinine dropped to 1.1 mg/dl.
1–12 months	Progressive clinical recovery with sustained normal blood pressure, renal function and no recurrent dialysis or major gynecological complications.

4. Discussion

This case describes EMAC maintained for approximately 65 minutes during inter-facility transfer for life-threatening obstetric hemorrhage when the referring facility lacked blood products and NASG. The patient had massive blood loss and subsequently developed dialysis-requiring AKI. Her survival followed EMAC, transfer, transfusion, definitive surgical hemorrhage control, intensive care, and dialysis; it cannot be attributed to EMAC alone.

4.1 Physiological Basis and Use as a Bridge

EMAC mechanically reduces blood flow through the abdominal aorta below the compression site and may temporarily reduce distal perfusion during severe hemorrhage. In this case, femoral pulse disappearance was used as a practical indicator of compression. The maneuver requires no specialized equipment, but it is a temporizing measure only. It must not delay referral, resuscitation, transfusion, or definitive hemorrhage control. [3–5, 8]

4.2 Relevance in Resource-Limited Settings

Obstetric emergencies in resource-limited settings may be complicated by delays in recognition, transport, blood availability, specialist care, and operating-room access. EMAC may be considered when a NASG is unavailable and definitive treatment is delayed, but this case does not establish its efficacy or safety compared with other measures. It should be used only as a bridge to comprehensive care. [1, 3]

4.3 Prolonged Compression and Monitoring

The 65-minute duration is notable, but evidence about prolonged external aortic compression is limited. Continuous blood-pressure monitoring was unavailable during transfer, and safety cannot be inferred from a single case. Clinical assessment should continue whenever feasible, and definitive treatment should not be delayed. [8]

4.4 Acute Kidney Injury, Strengths, and Limitations

The creatinine peak of 13.2 mg/dL and approximately 48 hours of anuria were consistent with severe AKI following profound blood loss and shock, although the exact mechanism cannot be established retrospectively. Three dialysis sessions were followed by sustained renal recovery through 12 months. Longitudinal follow-up is a strength of this report. Limitations include the absence of continuous hemodynamic monitoring during EMAC, unavailable baseline creatinine, and the inability to determine whether EMAC independently contributed to survival.

Declarations

Ethical approval

Not applicable

Consent for publication

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Author Contribution

NAA: management of the patient, wrote the original draft, and revision of the final manuscript, Supervision KTY: Writing– original draft, Conceptualization, MGF: Writing– review & editing, Picture drawing, FSK: Writing– review & editing, Resources, MAF: Writing– review & editing

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Availability of data and materials

Not applicable

Competing interests

None

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Figures



Figure 1

Schematic illustration of external manual aortic compression during transfer for life-threatening obstetric hemorrhage. The illustration depicts the maneuver and is not a photograph of the patient or the actual transfer.