

## Maternal Near-Miss: A Perimortem Caesarean Section Resulting in a Remarkable Foetomaternal Recovery in a Rural Tertiary Care Centre in Eastern India

Dasgupta Anirban<sup>1</sup> · Ramotra Rohini<sup>1</sup> · Santra Debjyoti<sup>1</sup> · Dasgupta Subhendu<sup>1</sup> · Pushpam Preeti<sup>1</sup> · Mandal Sibapada<sup>1</sup> · Murmu Shankar<sup>1</sup>

Received: 13 May 2016 / Accepted: 24 July 2016 / Published online: 13 August 2016  
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### About the Author



**Dr. Anirban Dasgupta** has done his MBBS and MS in Obstetrics and Gynaecology followed by senior residency in JIPMER, Pondicherry, where he developed a keen interest in maternal medicine and high-risk pregnancy. His experience has come in handy during his current stint as a tutor in a tertiary care centre in rural Bengal (BSMCH) notorious for its high delivery rates (~21,000 annually) and complicated eclampsia patients.

Dr. Dasgupta Anirban MBBS (JIPMER), MS-OBG (JIPMER), DNB-OBG is Clinical Tutor in Department of Obstetrics and Gynaecology at Bankura Sammilani Medical College and Hospital (BSMCH), Gobindanagar, Bankura, India; Dr. Ramotra Rohini is DNB-OBG Postgraduate Trainee in Department of Obstetrics and Gynaecology at BSMCH, Gobindanagar, Bankura, India; Dr. Santra Debjyoti MBBS, MD-OBG (PGI Chandigarh) is Associate Professor in Department of Obstetrics and Gynaecology at BSMCH, Gobindanagar, Bankura, India; Dr. Dasgupta Subhendu MBBS, MD-OBG (PGI, Chandigarh), FICS, FICOG is Professor and Head of the Department of Obstetrics and Gynaecology at BSMCH, Gobindanagar, Bankura, India; Dr. Pushpam Preeti is MS-OBG Postgraduate Trainee in Department of Obstetrics and Gynaecology at BSMCH, Gobindanagar, Bankura, India; Dr. Mandal Sibapada is MS-OBG Postgraduate Trainee in Department of Obstetrics and Gynaecology at BSMCH, Gobindanagar, Bankura, India; Dr. Murmu Shankar is MS-OBG Postgraduate Trainee in Department of Obstetrics and Gynaecology at BSMCH, Gobindanagar, Bankura, India.

**Electronic supplementary material** The online version of this article (doi:10.1007/s13224-016-0927-6) contains supplementary material, which is available to authorized users.

✉ Dasgupta Anirban  
dr.anirbandasgupta@gmail.com

<sup>1</sup> Department of Obstetrics and Gynaecology, Bankura Sammilani Medical College and Hospital (BSMCH), Gobindanagar, Bankura, India

## Introduction

Maternal near-miss is defined as a woman who nearly died but survived a complication during pregnancy, child birth or within 42 days after delivery (WHO 2011) [1]. West Bengal came close to achieving India's MDG target MMR of 109 (SRS data: 117), while for India overall the same figure stood at 174. Severe acute maternal morbidity (SAMM) and maternal near-miss identification by newly published WHO criteria have replaced MMR as the new benchmark to achieve this goal and provide learning points for similar situations in future.

Bankura Sammilani Medical college in rural West Bengal has high delivery rates up to 21,000 annually with eclampsia complicating 400–500 deliveries (the largest contributor) [2, 3]. The primary health care in the adjoining areas are poor, and we frequently come across patients with eclampsia complicated with ARF, HELLP syndrome, intra-cerebral haemorrhage and pulmonary oedema.

## Case Report

A 20-year-old unbooked primigravida had been referred at 39 weeks with eclampsia (four episodes of GTCS from 2 to 6 am) from a nearby PHC and arrived in casualty at 5:35 am on 3 May 2016 with complaints of breathlessness. She was not in labour.

## Sequence of Events

*6 am* Disoriented, BP: 160/110 mm Hg, PR: 104/min, SpO<sub>2</sub>: 70–80 % in propped-up position, O<sub>2</sub> mask in eclampsia room. RS: widespread crepitations suggestive of pulmonary oedema +/- aspiration. RR: 40/min with gasping, use of intercostals muscle. FHR: 130 bpm, but on connecting CTG, there were variable dips.

*Actions* Entire team called for help. Two large bore i.v cannula secured, mouth gag and suction for secretions, O<sub>2</sub> by mask at 15 l/min, i.v and i.m loading doses of MgSO<sub>4</sub> as per Pritchard's regimen given after urinary catheter insertion along with i.v labetalol 20 mg over 3–5 min. CBC, blood urea, creatinine, LFT and uric acid sent. I.V fluids withheld. Two bolus doses of 20 mg i.v furosemide given. A high-risk informed consent taken from her husband. On-call anaesthetist and consultant obstetrician informed. Level 2 ICU bed asked for—not available immediately.

*6:15 am* Respiratory failure resulted in arrest. SpO<sub>2</sub>, PR, BP no longer recordable. No patient response.

*Actions* BMV started with chest compressions (100/min) at 30:2 ratio. Inj. adrenaline 1 amp +1 further 20 mg i.v furosemide stat. HR auscultated initially at 146 bpm at 6:25 am but not heard thereafter. Defibrillator not functional. Anaesthetist busy in OT. A consultant-led decision was taken to perform a perimortem caesarean section then and there, without shifting her, as a last-ditch effort. Decision orally communicated to husband with a caveat that mother and baby may still be lost. He agreed with whatever was in her best interests.

With a No. 12 sterile surgical blade alone (there was no time to even mount the BP handle) and an episiotomy repair tray only, a Pfannenstiel incision was made by the author and the subsequent layers opened bluntly. The tissue was pale, and it appeared like a near-cadaveric dissection with minimal blood loss. The pale uterus was opened by a lower segment incision since the bladder was empty because of the urinary catheter. A girl baby of 2600 g was delivered within 5 min of incision at 6:35 am alive with Apgar of 5 and 8 (1 and 5 min) and shifted to SNCU. The liquor was clear with hind water meconium. No oxytocin was given. Attempt at manual removal of placenta resulted in inversion of the flaccid, pale uterus out of the incision. Placenta separated on repositioning uterus back and uterus repaired in its flaccid state with both the layers with No. 1 chromic catgut. She was shifted back left laterally, and the rectus sheath was repaired with No. 1 polyglactin 910 along with the skin closure with No. 1 Ethilon mattress at 6:55 am. CPR was continued throughout. Still no response and no palpable pulse or recordable BP. No urine in bag.

*7 am* On-call anaesthetist arrived, intubated the patient, gave ET suction and BMV, and chest compressions continued.

*7:05 am* We obtained a reading of PR of 120/min and a SpO<sub>2</sub> of 70–80 % on reconnecting the monitor to our great joy and surprise. Chest compressions stopped and ET also removed by anaesthetist on return of spontaneous respiratory efforts. BMV continued.

*7:30 am* SpO<sub>2</sub> improved to 85–90 %, BP: 150/100 mm Hg and a PR: 150/min (probably due to i.v adrenaline effect). ICU bed arranged and patient mobilised on a trolley with O<sub>2</sub> cylinder. By this time we even obtained an urine output of 800–1200 ml that was emptied. She was started on one unit of blood transfusion in ICU, along with maintenance Labetalol i.v 20 mg 8-hourly. Intravenous meropenem with amikacin started along with i.v tramadol 50–100 mg 8 hourly with anti-emetics. NSAIDs were avoided. *Her*

**Table 1** Vitals and investigations in ICU

Date	Vitals	CBC	RFT	LFT
3 May 2016	PR: 110 bpm, BP ~ 140/100 mmHg, SpO <sub>2</sub> : 95 % on O <sub>2</sub> , input/output: 2100/1800 ml	Hb: 10.4 g%, Plts: 1.44 lacs/mm <sup>3</sup>	Cr: 1.0 mg%, uric acid: 7.08 mg%	SGOT: 202 IU/dl, SGPT: 292 IU/dl
4 May 2016	PR: 100 bpm, BP: 140/100 mm Hg SpO <sub>2</sub> : 96 % on room air, input/output: 2000/2300 ml	Hb: 10.2 g%, Plts: 90,000/mm <sup>3</sup>	Cr: 0.8 mg%	SGOT: 198 IU/dl, SGPT: 274 IU/dl

**Fig. 1** In post-operative ward after being shifted from ICU

husband and relatives were debriefed of the entire incident and the procedure with information about her continuing high-risk status.

At ICU at 8:30 am PR: 112/min, BP: 140/100 mm Hg, SpO<sub>2</sub> of 95 % on O<sub>2</sub> mask. The uterus felt more contracted than before. Chest crepitations had reduced with RR: 32/min. Continuous one to one monitoring was done. Injection MgSO<sub>4</sub> i.m 4 hourly injections were recommenced 6 h later from 2 pm till 24 h post-natally. She did not have any PPH/ wound site bleeding (Table 1).

This lady remarkably recovered uneventfully with rapid improvement of consciousness and vitals (Fig. 1). Anti-hypertensives were slowly tapered. She was shifted to our post-operative ward from ICU as early as

**Fig. 2** With her baby prior to discharge

5 May 2016 (POD-2) at 1 pm. Appropriate wound care was taken, and there was no sign of sepsis. Her baby was kept in SNCU for 6 days and shifted motherside on 10 May 2016 (POD-6) (Fig. 2). Sutures were removed the following day, and the mother was discharged on 12 May 2016 with BP: 130/80 mm Hg not on anti-hypertensives and normal investigations (Hb: 9.4 g %, plts: 2.96 lacs/mm<sup>3</sup>, blood urea: 25 mg/dl, creatinine: 0.6 mg/dl, SGOT and SGPT: 45 and 29 IU/dl) on POD-7.

**Table 2** Adapted from mother and baby reducing risk through audits and confidential enquiries (MBRRACE) UK 2009–2012 page 61

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Pregnant women become hypoxic more quickly than non-pregnant and irreversible brain damage ensues within 4–6 min. Delivery of the foetus and placenta aids resuscitation. Procedure is mainly in maternal, not foetal, interests
Take the decision to perform a caesarean section if there is no cardiac output after 4 min of collapse. Do it with ongoing resuscitation and evacuate the uterus even if there is delay
Aim to deliver foetus and placenta within 1 min and do it on the spot—do not attempt to move to theatre
No anaesthetic is required and a scalpel is the only instrument required
Use the incision that gives the most rapid access and according to surgeon's comfort
Close uterus and abdomen in the usual way if resuscitation successful and shift to a more suitable environment

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## Discussion

The RCOG guideline No. 56(2011) on maternal collapse and MBRRACE-UK maternal mortality 2009–2012 reports [4] have highlighted the importance and basic tenets of perimortem caesarean section in pregnancies with gestational age beyond 20 weeks which have been summarised in Table 2.

Perimortem caesarean sections are rarely performed and even rarely reported due to their morbid outcomes and need an alert emergency obstetric and anaesthetic team with quick decision-making skills. CEMACH reports from the UK suggest ~54 % livebirth rates of the babies [5], and we were indeed fortunate to deliver an alive baby and revive the mother simultaneously. The literature says that a midline vertical skin incision with classical uterine incision may provide the quickest access, but then, it depends on the surgeon's comfort; we were more comfortable with a Pfannenstiel skin incision and a lower segment uterine incision.

A left lateral tilt to the gravid uterus improves cardiac output by 25 %, while decompressing the uterus results in improvement of the stroke volume by 60 % (RCOG) and is mandatory after 5 min of resuscitation showing no improvement. A pre-mounted scalpel blade and two cord clamps should be kept ready in the resuscitation trolley in all labour wards so that there is no delay in performing the procedure. We did not have it ready and had to improvise with an episiotomy tray. The on-call anaesthetists are overburdened, and we were extremely fortunate to achieve this result in spite of delay in intubation and non-functional defibrillator. Training and skill drills of labour ward staff in basic and advanced adult resuscitation with anticipation of the difficulties with CPR encountered in pregnancy will go a long way in saving the lives of more mothers and sometimes their babies.

**Acknowledgments** Special thanks to the other members on-call that night without whom this would not have been possible: the anaesthetist Dr. Ashish Paul and the labour room nursing staff.

## Compliance with Ethical Standards

**Conflicts of interest** The authors Dr. Anirban, Dr. Rohini, Dr. Debjyoti, Dr. Subhendu, Dr. Preeti, Dr. Sibapada and Dr. Shankar declare that they do not have any conflicts of interest.

**Ethical Approval** No animals were used during this study. All procedures performed in this report on humans were in accordance with the ethical guidelines of the institute's research committee and in compliance with the 1964 Declaration of Helsinki and its later amendments and ethical standards.

**Informed Consent** Informed consent was obtained from the subject(s) involved.

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