



Total intravenous anaesthesia (TIVA) use for caesarean delivery - incidence and outcomes from a tertiary centre



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Introduction

- Caesarean delivery (CD) under general anaesthesia (GA) is traditionally performed using an intravenous induction agent followed by maintenance of anaesthesia with a volatile agent.
- Total intravenous anaesthesia (TIVA) is becoming increasingly utilised in non-obstetric settings as the anaesthetic technique of choice due to conferring benefits such as better patient recovery and reduced environmental impact on global warming.

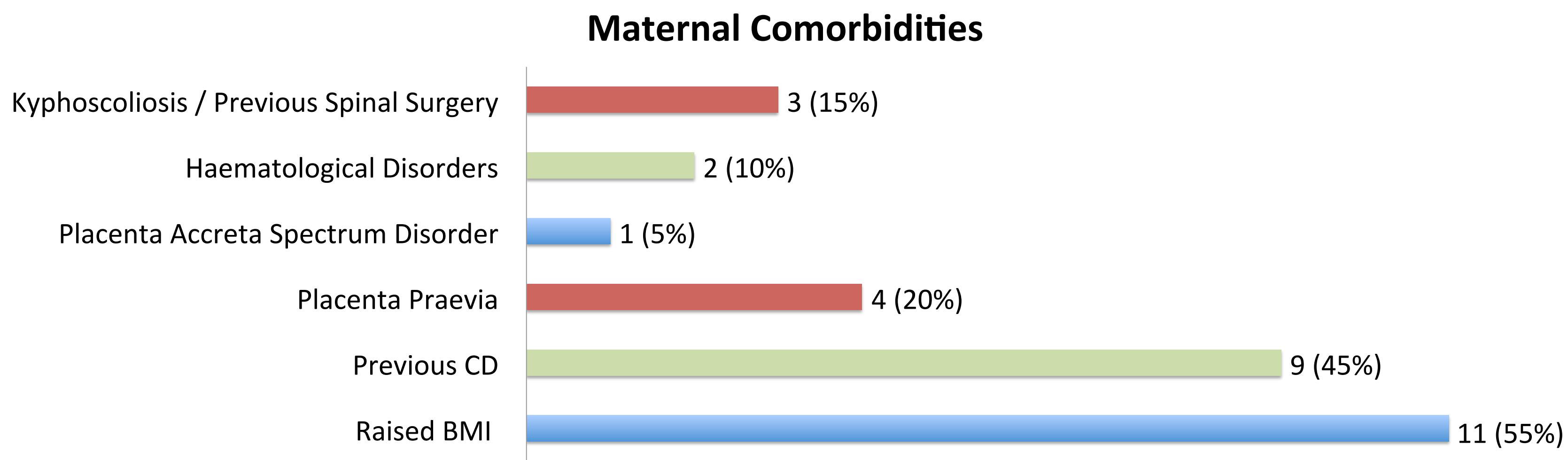
Method

- After obtaining audit committee approval, we reviewed electronic records of all patients having a caesarean delivery (CD) under GA at St. Mary’s Hospital, Manchester between January 1st 2021 and August 31st 2022.
- Our objective was to analyse caesarean deliveries performed using TIVA technique.
- Our aim was to highlight the patient characteristics, TIVA techniques utilised for GA along with the associated maternal and neonatal outcomes.

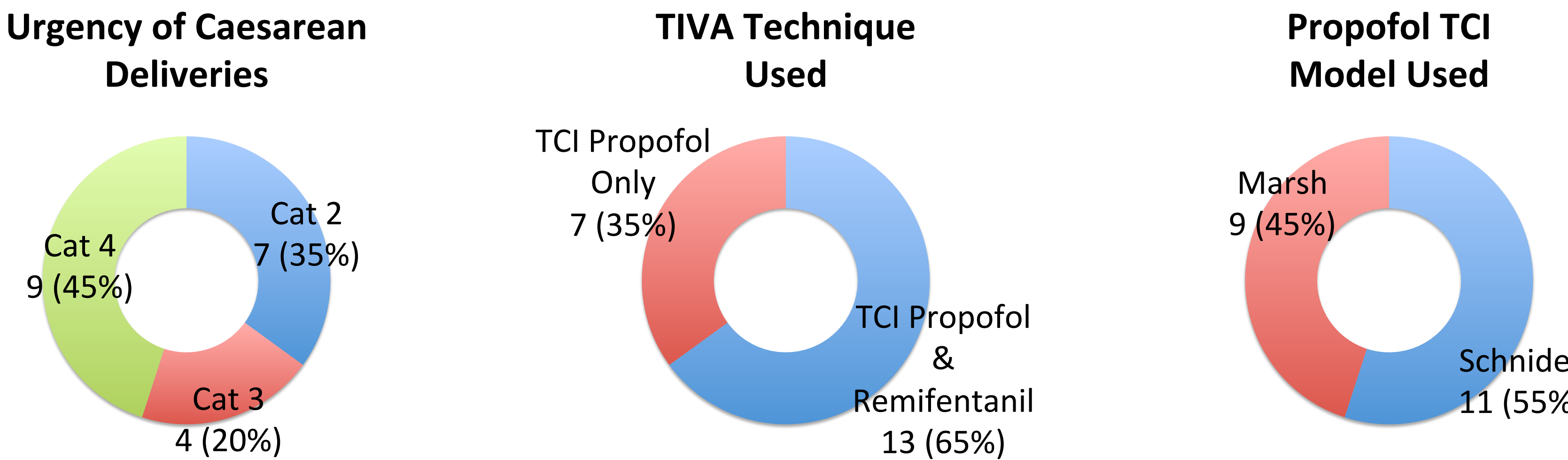
Results

- During the study period, we found 6% (n=20/331) of all CDs were performed utilising TIVA technique. Of these patients, 5 (25%) patients were primiparous whilst 15 (75%) were multiparous. The maternal demographics, indications, TIVA techniques utilised including the pharmacokinetic target-controlled infusion (TCI) models and the associated neonatal outcomes are described in the tables and figures below. Results are presented as number (proportion) or mean [standard deviation - SD]

Maternal Demographics	Mean [SD]
Age (years)	30.7 [6.1]
Body-mass index (BMI - kg/m²)	30.5 [7.8]
Parity	1.9 [1.8]
Gestational age at birth (weeks)	36.7 [2.9]



Maternal Outcomes	n (%) or Mean [SD]
Postpartum haemorrhage (PPH) > 500ml	16 (80%)
PPH >1000ml	8 (40%)
Estimated blood loss (ml)	2032 [2253]
Intensive care unit (ICU)/High-dependency unit (HDU) admission	7 (35%)
Accidental awareness	1 (5%)
Median length of hospital stay (days)[Range]	4 [1-41]



Neonatal Outcomes	n (%) or Mean [SD]
Prematurity (<37 weeks gestation)	7 (35%)
Birth weight (g)	2927 [607]
Apgar 1-min	5.2 [2.8]
Apgar 5-min	8.3 [1.8]
Umbilical Artery pH	7.17 [0.09]
Umbilical Vein pH	7.26 [0.07]
Neonatal intensive care unit (NICU) admission	1 (5%)

Discussion

- TIVA use is limited to a very small number of non-emergency cases where time constraint is not an issue.
- All TIVA cases were performed in routine working hours by a consultant anaesthetist using a non-depolarising muscle relaxant and Bispectral Index (BIS) depth of anaesthesia monitoring.
- Patients at significant risk of PPH, those with kyphoscoliosis/neurological co-morbidities and anaesthetic preference were the most common indications for TIVA use.
- There is significant variation in the way TIVA is being provided for CD.
- Accidental awareness remains a potential concern in patients having TIVA and was reported in one patient due to cannula displacement.
- Availability of depth of anaesthesia monitoring, unfamiliarity with TIVA technique and electroencephalography in obstetrics, and lack of research on the pharmacokinetic models in pregnant patients seem to be the common barriers to TIVA use in obstetrics.
- Further research using case-control studies focusing on quality of recovery, pain relief, ideal pharmacokinetic model, maternal and neonatal outcomes will influence future TIVA use for CD.

References

1. Metodiev Y, Lucas DN. The role of total intravenous anaesthesia for caesarean delivery. International journal of obstetric anesthesia. 2022; 51: 103548