PREVALENCE AND CURRENT PRACTICE OF OBSTETRIC TOTAL INTRAVENOUS ANAESTHESIA IN THE UNITED KINGDOM (Obs-TIVA UK): a service evaluation

Title: Prevalence and current practice of obstetric total intravenous anaesthesia in the United Kingdom (Obs-TIVA UK): a service evaluation

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Registration: Service evaluation 3650-06/07/2022, Cardiff and Vale University Health Board (CAVUHB)

Summary / Synopsis:

Title	Prevalence and current practice of obstetric total intravenous anaesthesia in the United Kingdom (Obs-TIVA UK): a service evaluation
Protocol short title / acronym	Obs-TIVA UK
Protocol version number and date	v 1.0 (08.09.2022)
Project Duration	12 months (subject to extension)
Lead Site	Cardiff and Vale University Health Board
Project Lead	Dr Yavor Metodiev, MD PhD FRCA
Medical Condition or disease under investigation	Use of total intravenous anaesthesia in obstetric population
Purpose of study	To identify current incidence and practice related to total intravenous anaesthesia in the obstetric population
Primary objective	To establish the current incidence of total intravenous anaesthesia (TIVA) for obstetric surgical interventions in the UK.
Secondary objective(s)	• Describe current practices when performing TIVA for obstetric surgery • Describe medical and obstetric characteristics of patients who receive TIVA • Describe the use of pEEG monitoring in obstetric TIVA • Describe adverse events when TIVA is used for obstetric surgery • Evaluate the effect of TIVA on the incidence and severity of postpartum haemorrhage • Describe the postoperative recovery period in patients who received TIVA for obstetric surgery • Describe effects of TIVA on the neonate
Number of subjects/patients	~ 100
Project type	Prospective, multicentre, service evaluation
Main inclusion criteria	• Any patient who received total intravenous anaesthesia (TIVA) for elective or emergency caesarean delivery. • Any patient who received total intravenous anaesthesia for obstetric surgery within 24 hours of delivery (manual removal of placenta, perineal repair, examination under anaesthesia, postpartum haemorrhage). • Conversion of regional anaesthesia to total intravenous anaesthesia during caesarean birth.
Data collected / storage (if applicable)	Anonymised data will be stored on REDCap® secure data capture server.

BACKGROUND

It is estimated that around 16 800 general anaesthetics (GA) for caesarean delivery are performed each year in the United Kingdom (UK).(1) Rapid sequence intubation followed by maintenance with inhalational anaesthetics has been the standard technique in obstetric and non-obstetric anaesthesia for decades. A substantial increase in the use of total intravenous anaesthesia (TIVA) in non-obstetric practice has occurred over the past decade, including where rapid sequence induction is used.(2) However, the most recent national guidelines on the use of total intravenous anaesthesia (TIVA) developed by the Association of Anaesthetists and the Society for Intravenous Anaesthesia make no recommendations on the use of TIVA in obstetrics and highlight this area as one where research is urgently needed.(2)

Extensive literature on acceptability and safety of TIVA has now been published. The technique has been occasionally used in obstetrics across the world, usually reserved as the safest option in high-risk women, such as those with malignant hyperthermia (MH) susceptibility or some neuromuscular disorders in which maintenance of general anaesthesia with inhalational agents is contraindicated.(3,4) TIVA may be delivered in several ways, but the most widely used method in the UK is by target-controlled infusions (TCI) of propofol and remifentanil, utilising pharmacokinetic models developed in young, healthy non-pregnant patients

Theoretical benefits of performing TIVA for caesarean deliveries:

- ***The effects of anaesthetic drugs on uterine tone***: Post-partum haemorrhage (PPH) remains a leading cause of maternal mortality and morbidity.(1) General anaesthesia in major PPH is likely to be recommended when the patient is haemodynamically unstable.(5) Uterine hypotony is the leading cause of PPH and the relaxing effect of inhalational anaesthetics may exacerbate this resulting in more prolonged bleeding with GA an independent risk factor for haemorrhage-related morbidity.(6) When administered at recommended doses to maintain TIVA, Propofol has been found to have a minimal effect on uterine tone.(7,8) Propofol anaesthesia may therefore be beneficial to reduce blood loss during GA for CS.
- ***Recovery after anaesthesia***: TIVA has been consistently reported to have a superior profile when it comes to postoperative recovery indicators in the non-obstetric population. Propofol-based anaesthesia has a lower incidence of PONV regardless of opioid use.(9) The reduction of PONV is even more pronounced when propofol is used for induction and maintenance of anaesthesia.(10) The direct antiemetic effect of propofol is achieved at very low plasma concentrations and lasts at least 30 minutes after discontinuation of the TCI.(11) Optimising recovery after obstetric anaesthesia is crucial to allow early establishment of infant feeding, allowing early mother and baby bonding and maximising wellbeing and positive experience. Recent local audit data showed that PONV had a significant impact on mother-infant bonding.
- ***Lower environmental impact of propofol***: Perioperative services are one of the largest greenhouse gas emitters in the healthcare industry (12), with emissions of inhalational anaesthetics implicated as significant contributors to global warming.(13) Reducing this negative impact on the environment is a key priority for anaesthetic services.(14) General anaesthesia in obstetrics is an uncommon event in high-income countries (15) but it is

important to highlight that inhalational anaesthesia is utilised almost exclusively in both the UK and international settings. The use of propofol-based TIVA has been found to have 4 times smaller green-house gas effect than halogenated anaesthetics and nitrous oxide (N2O).(13) Its impact on the environment is mainly due to energy used to run pumps and the disposal of plastic syringes, as well as disposal of unused drug. Minimising the environmental impact of anaesthesia in obstetric practice is therefore a part of a global initiative to reduce anaesthetic gas emissions. A recent survey amongst our service users in Cardiff revealed that two third of the surveyed subject are concerned about climate change and would like to reduce their carbon footprint.

Unanswered research questions in the use of TIVA for CDs

- ***Incidence:*** The incidence of using TIVA for obstetric patients is unknown in the UK and globally.
- ***Recovery:*** The advantages and disadvantages of TIVA over inhalational techniques, such as better recovery profile, reduced incidence of PONV, faster return to preoperative functional state, cardiovascular stability, reduced bleeding risk, are not well described for the obstetric population. Some of the potential disadvantages also need to be identified and described – pain on injection, the risk of gastric aspiration, the incidence of accidental awareness.
- ***Potential benefits of TIVA in high-risk pregnant patients***: TIVA may benefit pregnant patients who have co-morbidities, such as neuromuscular disorders, malignant hyperthermia susceptibility, intracranial and spinal pathology, cardiac disease where regional anaesthesia is contraindicated. There is little information of the use of TIVA in such conditions.
- ***Lack of pharmacokinetic models for TCI developed for pregnant patients:*** Most models currently used in clinical practice have been developed in young healthy subjects(16) and are likely to misrepresent the pharmacokinetics in certain patient groups including the obese and pregnancy.(2) We know that pregnancy leads to marked pharmacokinetic changes and pregnancy-specific dosing regimens have been developed and studied for drug such as antiepileptic and antimicrobial drugs.(17)
- ***Effect on the neonate***: Several case reports(3,4,18–23) and one case series(24) describe the use of TIVA or TCI remifentanil for caesarean deliveries. All the patients described delivered healthy babies that did not require major interventions at birth. This is promising data in view of fetal and neonatal safety, but further data is required on the choice of anaesthetic agent and neonatal condition at birth and in the first hours of life.

PROJECT DESIGN

Prospective, multicentre, service evaluation

PRIMARY OUTCOME

To establish the current incidence of total intravenous anaesthesia (TIVA) for obstetric surgical interventions in the UK.

SECONDARY OUTCOMES

- Describe current practices when performing TIVA for obstetric surgery
- Describe medical and obstetric characteristics of patients who receive TIVA
- Describe the use of pEEG monitoring in obstetric TIVA
- Describe adverse events when TIVA is used for obstetric surgery
- To evaluate the effect of TIVA on the incidence and severity of postpartum haemorrhage
- Describe the postoperative recovery period in patients who received TIVA for obstetric surgery
- Describe effects of TIVA on the neonate

ELIGIBILITY CRITERIA

Inclusion criteria:

- Any patient who received total intravenous anaesthesia (TIVA) for elective or emergency caesarean delivery.
- Any patient who received total intravenous anaesthesia for obstetric surgery within 24 hours of delivery (manual removal of placenta, perineal repair, examination under anaesthesia, postpartum haemorrhage).
- Conversion of regional anaesthesia to total intravenous anaesthesia during caesarean birth.

Exclusion criteria:

- Non-obstetric surgery during pregnancy.
- Conversion of inhalational anaesthesia to TIVA after delivery of the fetus.

METHODS

This will be a prospective, multicentre service evaluation.

Patients will receive standard routine care decided by the team caring for them. The project team will collect data from the anaesthetic chart, clinical notes, and any other data base (paper-based or electronic) regarding the case. All data will be anonymised.

The project will be registered with local Audit or Service evaluation departments. The Project lead's Institution and the Recruiting Sites will sign data sharing agreement. This may need to be approved by Caldicott guardians in each Site depending on local policies (not a requirement from CAVUHB). Data collection and submission to the Project Lead will be via an online data collection platform (REDCAP®).

The anticipated recruitment period is 1 year but this may be changed depending on the rate of recruitment and possible changes in practice. This will be reassessed at regular intervals.

DATA

Each hospital taking part will have nominated staff who will be responsible for data collection. Data collection will comprise of 3 parts.

Part 1: Each site lead will be asked to complete a site recruitment questionnaire via REDCAP® upon registration to take part in the project

Part 2: For each included patient, the anaesthetist or a member of the anaesthetic team will be asked to complete an online case record form (CRF) via a secure web-based portal onto a secure database. The database will have data validation rules built-in to ensure accurate data entry (e.g. range checks, and field validation).

Local investigators will be responsible for ensuring accuracy and completeness of data. Where appropriate, this should include cross-checking with patient notes and other sources of information.

A paper version of the CRF is available (Appendix 1) to aid local data collection. Completed paper CRFs will be stored in a secure location accessible by the local project lead and other named members of the project team in accordance with NHS Information Governance standards. Information from each paper CRF will be entered via the secure web-based portal onto the secure database.

No patient-identifiable information will be uploaded to the secure database. Each site may elect to use a local ID upon the paper CRF to facilitate retrospective data capture within the immediate time frame of the project however this should be detached once the CRF is completed and will not form part of the dataset uploaded to the data capture server. Paper CRFs will be retained by the local project team in a locked, secure location in the hospital for a period of 6 months after the project ends to allow queries about quality to be addressed during data cleaning and analysis. The local ID will not remain upon the CRF during this period.

Part 3: Each site lead will be asked to complete an end of project questionnaire which will include total number of eligible cases done during the project period and feedback on participation.

All investigators and any other individuals contributing to the project will be required to comply with the Data Protection Act 2018 and the NHS code of confidentiality.

SAMPLE SIZE

The estimated number of general anaesthetics in obstetrics is approximately 16 000 per year in the UK. The majority of these are for category 1 caesarean deliveries which are unlikely to be executed by TIVA. It is impossible to further estimate the type of anaesthesia (TIVA or inhalational) performed but the proportion of TIVAs will be significantly lower than inhalational. We aim to collect data for at least 100 TIVA cases. This number may change depending on uptake of the project and changes in practice during the recruitment period.

STATISTICS

Cohorts and outcomes will be reported using descriptive statistics. Nonparametric variables will be described as median and IQR. Descriptive statistics will be used to report incidences, frequencies, and proportions (median, IQR, CI). Comparison of continuous data will utilise Student t-test and Mann-Whitney U test depending on distribution. Categorical data will be analysed by Chi-square test or Fisher's exact test depending on sample size. Other statistical methods will be applied as appropriate to the data distribution and quality.

Patients who develop complications or side effects of the technique used will be analysed by logistic regression to attempt identification of odds ratios.

ETHICAL CONSIDEARTIONS

The project is entirely observational and will not affect the care provided to eligible patients. All data collected and analysed is routinely documented data.

The need for consent has been waived by the Research Department in Cardiff and Vale UHB as the project is not research and poses no risks to patients or their health-related data.

Data sharing between hospitals will be regulated by signing Data sharing agreements between the Project Lead and local Leads in each hospital (compliant with IG policies and GDPR). These agreements may need local Caldicott Guardian approvals, according to local policies.

REFERENCES

1. Knight M, Bunch K, Tuffnell D, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2016-18. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2020.
2. Nimmo AF, Absalom AR, Bagshaw O, Biswas A, Cook TM, Costello A, et al. Guidelines for the safe practice of total intravenous anaesthesia (TIVA): Joint Guidelines from the Association of Anaesthetists and the Society for Intravenous Anaesthesia. *Anaesthesia* 2019;**74**:211–24.
3. Foster RN, Boothroyd KP. Caesarean section in a complicated case of central core disease. *Anaesthesia* 2008;**63**:544–7.
4. Xiao W, Zhao L, Wang F, et al. Total intravenous anesthesia without muscle relaxant in a parturient with amyotrophic lateral sclerosis undergoing cesarean section: A case report. *J Clin Anesth* 2017;**36**:107-9.
5. Prevention and Management of Postpartum Haemorrhage: Green-top Guideline No. 52. BJOG: An International Journal of Obstetrics and Gynaecology. 2017;124:e106–49.
6. Butwick AJ, Carvalho B, El-Sayed YY. Risk factors for obstetric morbidity in patients with uterine atony undergoing Caesarean delivery. *Br J Anaesth* 2014;**113**:661–8.
7. Shin YK, Kim YD, Collea JV. The effect of propofol on isolated human pregnant uterine muscle. *Anesthesiology* 1998;**89**:105-9.
8. Thind AS, Turner RJ. In vitro effects of propofol on gravid human myometrium. *Anaesth Intensive Care* 2008;**36**:802-6.
9. Dershwitz M, Michałowski P, Chang Y, Rosow CE, Conlay LA. Postoperative nausea and vomiting after total intravenous anesthesia with propofol and remifentanil or alfentanil: how important is the opioid? *J Clin Anesth* 2002;**14**:275-8.
10. Chandrakantan A, Glass PS. Multimodal therapies for postoperative nausea and vomiting, and pain. *Br J Anaesth* 2011;**107** Suppl 1:i27-40.
11. Gan TJ, Glass PS, Howell ST, Canada AT, Grant AP, Ginsberg B. Determination of plasma concentrations of propofol associated with 50% reduction in postoperative nausea. *Anesthesiology* 1997;**87**:779-84.

12. McGain F, Muret J, Lawson C, Sherman JD. Environmental sustainability in anaesthesia and critical care. *Br J Anaesth* 2020;**125**:680-692.
13. Ryan SM, Nielsen CJ. Global warming potential of inhaled anesthetics: application to clinical use. *Anesth Analg* 2010;**111**:92-8.
14. The NHS Long Term Plan, 2019. https://www.longtermplan.nhs.uk/publication/nhs-long-term-plan/ [Accessed online on 26 April 2022].
15. Ring L, Landau R, Delgado C. The current role of general anesthesia for Cesarean delivery. *Curr Anesthesiol Rep* 2021; **11**: 18-27.
16. Absalom AR, Mani V, De Smet T, Struys MM. Pharmacokinetic models for propofol--defining and illuminating the devil in the detail. *Br J Anaesth* 2009;**103**:26-37.
17. Koren G, Pariente G. Pregnancy- Associated Changes in Pharmacokinetics and their Clinical Implications. *Pharm Res* 2018;**35**:61.
18. Niki A, Ochiai D, Iwai M, Sato Y, Yoshino K, Yamada T. Management of pregnancy complicated by central core disease. *Int J Obstet Anesth* 2020;**43**:25-26.
19. Teixeira CEFA, Braga AFA, Braga FSDS, et al. Anesthesia for cesarean delivery in a patient with Klippel-Trenaunay syndrome. *Braz J Anesthesiol* 2018;**68**:641-4.
20. Orme RM, Grange CS, Ainsworth QP, Grebenik CR. General anaesthesia using remifentanil for caesarean section in parturients with critical aortic stenosis: a series of four cases. *Int J Obstet Anesth* 2004;**13**:183-7.
21. McCarroll CP, Paxton LD, Elliott P, Wilson DB. Use of remifentanil in a patient with peripartum cardiomyopathy requiring Caesarean section. *Br J Anaesth* 2001;**86**:135-8.
22. Macfarlane AJ, Moise S, Smith D. Caesarean section using total intravenous anaesthesia in a patient with Ebstein's anomaly complicated by supraventricular tachycardia. *Int J Obstet Anesth* 2007;**16**:155-9.
23. Llopis JE, Garcia-Aguado R, Sifre C, Rosso MT, Vivó M, Martin-Jurado J, Grau F. Total intravenous anaesthesia for caesarean section in a patient with Marfan's syndrome. *Int J Obstet Anesth* 1997;**6**:59-62.
24. Van de Velde M, Teunkens A, Kuypers M, Dewinter T, Vandermeersch E. General anaesthesia with target controlled infusion of propofol for planned caesarean section: maternal and neonatal effects of a remifentanil-based technique. *Int J Obstet Anesth* 2004;**13**:153-8.

Appendix 1.

SITE RECRUITMENT QUESTIONAIRRE

1. Hospital Site Name:

2. Approximate number of deliveries per year :

- ☐ Less than 3000
- ☐ 3000-5000
- ☐ 5000-8000
- ☐ Greater than 8000

3. Caesarean delivery rate:

Delivery rate (%)…… in (Year eg. 2021)……..

4. General Anaesthetics in Obstetrics per year:

Number of General Anaesthetics in Obstetrics …….. in (Year eg. 2021)……

5 (a). Which TIVA equipment is available in the Maternity department (select all that apply)

- ☐ Target-controlled infusion (TCI) pumps
- ☐ Depth of anaesthesia monitor
- ☐ TIVA delivery lines (giving sets)
- ☐ Train-of-four monitor

5 (b). Depth monitor type (if available):

- ☐ BIS (Bispectral Index)
- ☐ Narcotrend
- ☐ E-entropy
- ☐ Other [please specify]

6. Departmental Obstetric TIVA guidelines available: Yes / No

7. Staffing on Delivery suite (please provide typical week-day staffing numbers):

Consultant Anaesthetists:……..

Trainee / SAS Anaesthetists:…….

8. Have you completed the data sharing agreement with Cardiff and Vale UHB?

Yes / No / Pending

9. Have you registered the project with your local audit / service evaluation department?

Yes / No / Pending

Appendix 2

Sample Case Report Form – Paper version

Prevalence and current practice of obstetric total intravenous anaesthesia in the United Kingdom: a service evaluation

INCLUSION CRITERIA

- ☐ Patient received TIVA for elective or emergency caesarean delivery
- ☐ Patient received TIVA for obstetric surgery within 24 hours of delivery *(manual removal of placenta, perineal repair, examination under anaesthesia, postpartum haemorrhage)*
- ☐ Conversion of regional anaesthesia to TIVA during caesarean delivery

INDICATIONS FOR SURGERY:

Type of obstetric delivery: ☐ Caesarean delivery ☐ Other: _____

Indication for Caesarean Delivery: _____

Urgency of Caesarean Delivery[1]:

☐ Category 1 ☐ Category 2 ☐ Category 3 ☐ Category 4

PATIENT DETAILS

Age: _____ years Height: _____cm Weight: *(at booking)* _____kg

ASA Grade[2]: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 *(most recent)* _____kg

OBSTETRIC CHARACTERISTICS:

Parity:_____ Gestation: Weeks + days

Pregnancy type: ☐ Singleton ☐ Multiple

Obstetric Co-morbidities *(select all that apply)*:

☐ Gestational Diabetes ☐ Pre-eclampsia ☐ Obstetric Cholestasis

☐ Sepsis ☐ Other:_____

Co-morbidities unrelated to pregnancy *(select all that apply)*:

- ☐ Neuromuscular disorders _____
- ☐ Malignant hyperthermia susceptibility _____
- ☐ Cardiac _____
- ☐ Neurological / Neurosurgical _____
- ☐ Coagulopathies _____
- ☐ Respiratory _____
- ☐ Other:_____

ANAESTHESIA DETAILS *(select all that apply)*

Indication for GA:
- ☐ Medical co-morbidity
- ☐ Urgency
- ☐ Patient choice
- ☐ Contraindication to Regional Anaesthesia
- ☐ Conversion from Regional Anaesthesia
- ☐ Failed Regional Anaesthesia
- ☐ Other:_____

Reason for TIVA:
- ☐ Neurological/Neuromuscular disorder
- ☐ Malignant hyperthermia susceptibility
- ☐ Cardiac disorders
- ☐ Anaesthetist's preference
- ☐ Severe PONV
- ☐ High risk of PPH
- ☐ Other: _____

TIVA Drugs Used:
- ☐ Propofol
- ☐ Remifentanil
- ☐ Other:_____

Propofol infusion method:
- ☐ TCI
- ☐ mls/hr
- ☐ Intermittent boluses

Propofol TCI model:
- ☐ Marsh
- ☐ Schnider
- ☐ Eleveld
- ☐ Other:_____

Propofol TCI targets: Induction_____ (mcg/ml)
Maintenance_____ (mcg/ml)
(provide range if applicable)

Remifentanil infusion method:
- ☐ TCI
- ☐ mls/hr

Remifentanil infusion model:
- ☐ Minto model
- ☐ Eleveld model

Induction technique:
- ☐ Manual Bolus
- ☐ Pump Bolus
- ☐ Hybrid (3-way tap/syringe method)

Remifentanil TCI targets: Induction_____ (ng/ml)
Maintenance_____ (ng/ml)
(provide range if applicable)

Equipment Used:
- ☐ Dedicated TIVA cannula
- ☐ Dedicated TIVA giving set
- ☐ Cannula Visible

Depth of anaesthesia monitor:
- ☐ not used
- ☐ Bispectral Index (BIS)
- ☐ Narcotrend
- ☐ E-Entropy
- ☐ Other: _____

Monitoring Used:
- ☐ Standard (3-lead ECG, NIBP, SpO2)
- ☐ Invasive arterial BP
- ☐ Neuromuscular recovery

Depth of anaesthesia targets: _____

Muscle relaxant used: ☐ Yes ☐ No

NMB reversal used: ☐ Yes ☐ No

INTRAOPERATIVE DETAILS DETAILS
(select all that apply)

Uterotonics Used:
- ☐ Oxytocin (bolus)_____ Dose
- ☐ Oxytocin (infusion)_____
- ☐ Carbetocin _____
- ☐ Carboprost _____
- ☐ Ergometrine _____
- ☐ Syntometrine _____

Blood loss measurement type:
- ☐ Measured Blood Loss
- ☐ Estimated Blood Loss

Blood Loss: _____mls

Tranexamic acid given: ☐ Yes ☐ No

Antiemetics given: ☐ Yes ☐ No

Vasopressors Used:
- ☐ Phenylephrine bolus _____ Dose
- ☐ Phenylephrine infusion _____
- ☐ Ephedrine _____
- ☐ Metaraminol _____
- ☐ Noradrenaline infusion _____

Magnesium given: ☐ Yes ☐ No

Vagolytics given: ☐ Yes ☐ No

AIRWAY MANAGEMENT

Cricoid pressure used: ☐ Yes ☐ No

Laryngoscope used: ☐ Yes ☐ No

If yes: ☐ VL ☐ DL

Airway device used:
- ☐ Tracheal Tube ☐ SGA
- ☐ Facemask

POSTOPERATIVE & RECOVERY DETAILS *(Note: as at 6 hours from end of GA)(select all that apply)*

Nausea & Vomiting: ☐ Yes ☐ No

Additional antiemetics given: ☐ Yes ☐ No

Pain Scores (Scale 0-10):
0 = no pain 10 = worst pain imaginable

1 hour post-op _____
4 hours post-op _____
6 hours post-op_____

Post-op analgesia:
- ☐ Morphine _____ Route of Administration
- ☐ Tramadol _____ Route of Administration
- ☐ Diclofenac _____
- ☐ Diamorphine _____
- ☐ Paracetamol _____
- ☐ Ibuprofen _____
- ☐ Abdominal wall block (eg. TAP, QL)
- ☐ Other_____

Time until first eating/drinking: _____ minutes

Time until first skin-to-skin: _____ minutes

Time until first mobilisation: _____ hours

NEONATAL DETAILS

Birth Timing:
- ☐ During TIVA
- ☐ Prior to initiation of TIVA
- ☐ N/A (no birth during procedure)

Stillbirth / Intrauterine death: ☐ Yes ☐ No

APGAR Scores *(Scale 0-10)*:
1 minute _____
5 minutes _____
10 minutes _____

Respiratory Support needed: ☐ Yes ☐ No

If Yes: ☐ Inflation breaths ☐ CPAP ☐ NIV ☐ I&V

Unplanned NICU admission: ☐ Yes ☐ No

Time until first breastfeeding: _____ minutes

PLEASE DETACH THIS SECTION AND SECURELY DISCARD ONCE DATA COLLECTION IS COMPLETE

Local ID: _____

Obs TIVA UK Data Capture Form v1.0

Obs TIVA UK Data Capture Form v0.1-Draft Notes

1) Urgency of Caesarean Delivery is defined as per Lucas DN et al. (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1298057/pdf/10928020.pdf)
    a. Category 1 – immediate threat to life of woman or fetus
    b. Category 2 – maternal or fetal compromise which is not immediately life-threatening
    c. Category 3 – needing early delivery but no maternal or fetal compromise
    d. Category 4 – at a time to suit the patient and maternity team
2) ASA Grade is as per the ASA physical status classification system, updated 2020 (https://www.asahq.org/standards-and-guidelines/asa-physical-status-classification-system) Note:* *Although pregnancy is not a disease, the parturient' s physiologic state is significantly altered from when the woman is not pregnant, hence the assignment of ASA 2 for a woman with uncomplicated pregnancy.*

ASA PS Classification	Definition	Adult Examples, Including, but not Limited to:	Obstetric Examples, Including but not Limited to:
ASA I	A normal healthy patient	Healthy, non-smoking, no or minimal alcohol use	
ASA II	A patient with mild systemic disease	Mild diseases only without substantive functional limitations. Current smoker, social alcohol drinker, pregnancy, obesity (30<BMI<40), well-controlled DM/HTN, mild lung disease	Normal pregnancy*, well controlled gestational HTN, controlled preeclampsia without severe features, diet-controlled gestational DM.
ASA III	A patient with severe systemic disease	Substantive functional limitations; One or more moderate to severe diseases. Poorly controlled DM or HTN, COPD, morbid obesity (BMI ≥40), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, ESRD undergoing regularly scheduled dialysis, history (>3 months) of MI, CVA, TIA, or CAD/stents.	Preeclampsia with severe features, gestational DM with complications or high insulin requirements, a thrombophilic disease requiring anticoagulation.
ASA IV	A patient with severe systemic disease that is a constant threat to life	Recent (<3 months) MI, CVA, TIA or CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, shock, sepsis, DIC, ARD or ESRD not undergoing regularly scheduled dialysis	Preeclampsia with severe features complicated by HELLP or other adverse event, peripartum cardiomyopathy with EF <40, uncorrected/decompensated heart disease, acquired or congenital.
ASA V	A moribund patient who is not expected to survive without the operation	Ruptured abdominal/thoracic aneurysm, massive trauma, intracranial bleed with mass effect, ischemic bowel in the face of significant cardiac pathology or multiple organ/system dysfunction	Uterine rupture.
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes		