

Evaluation of the obstetric anaesthesia procedures at Mater Dei Hospital in 2019

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INTRODUCTION

The aim of this retrospective study was to investigate all obstetric anaesthesia procedures at Mater Dei Hospital (MDH) in 2019 to better understand the care provided by anaesthetists to parturients.

METHODOLOGY

Data was collected from the obstetric anaesthesia logbook, a paper record in which the duty anaesthetist at the Central Delivery Suite (CDS) lists all anaesthetic interventions carried out over the previous 24 hours. All procedures were entered into a spreadsheet and coded. Calculations were then carried out to work out five parameters: the Caesarean section rate, the epidural uptake rate, the regional anaesthesia rate, the anaesthetic intervention number, and the Obstetric Anaesthesia Activity Index (OAAI).

RESULTS

There were 4040 deliveries at MDH in 2019. 1194 lower segment Caesarean sections (LSCS) were recorded in the obstetric anaesthesia logbook and the Caesarean section rate was 29.6%. A total of 966 spinal anaesthetics were carried out, 907 (94%) of which were for a LSCS. 1064 epidural catheters were inserted for labour analgesia, with a 26.3% epidural uptake rate for 2019. There were 109 parturients who required a general anaesthetic. The anaesthetic intervention number was 2350 and the Obstetric Anaesthesia Activity Index was 7.09.

CONCLUSION

The parameters listed above are described and compared to international guidelines and other descriptive studies. With 2350 anaesthetic interventions in obstetrics, anaesthetists were actively involved in the care of over half of all parturients at MDH in 2019 and this confirms the wide and considerable role anaesthetics has in maternal services provided at MDH.

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INTRODUCTION

Obstetric anaesthesia is one of the more important anaesthetic sub-specialties which enables the provision of high-quality care for hundreds of women every year during their pregnancy and around the time of giving birth. One in every 4 women now deliver by Caesarean section and Caesarean section rates continue to increase worldwide.¹ Moreover, many parturients receive anaesthetist-administered labour analgesia and several others require anaesthetic input in the form of pre-delivery assessment and planning, postoperative pain management, support to midwifery care and rarely treatment in intensive care units.² Demand for anaesthetic services is set to continue growing especially with an increasing average women's age at the time of birth, maternal preference for Caesarean delivery and epidural analgesia and increasing comorbidities like obesity.³

The aim of this retrospective study was to investigate and evaluate all obstetric anaesthesia procedures for 2019 and in so doing understanding the care provided by anaesthetists to women at a crucial time of their lives. This information would also help in the allocation human resources, designing training programmes for doctors and allied health professionals, comparing standards of care with those of other centres abroad and serve as denominator data for other audits.

MATERIALS AND METHODS

Permission to carry out this study was obtained from the Chairperson of the Department of Anaesthesia and Intensive Care and the Data Protection Officer at Mater Dei Hospital (MDH).

Data was collected from the obstetric anaesthesia logbook, a paper record in which the duty anaesthetist at the MDH Central Delivery Suite (CDS) lists all anaesthetic interventions carried out

over the previous 24 hours. This logbook has two important roles: to serve as a database of obstetric anaesthesia procedures done at MDH and to track parturients who need follow-up after delivery. All procedures listed in the 2019 obstetric anaesthesia logbook were entered into an MS Excel spreadsheet and coded. Calculations were carried out using MS Excel.

Five parameters were worked out to understand the anaesthetic workload in obstetrics for 2019: the Caesarean section rate i.e. the number of Caesarean deliveries as a percentage of all deliveries, the epidural uptake rate i.e. the number of epidural catheters inserted for labour analgesia, the regional anaesthesia rate i.e. the number of women receiving regional anaesthetic/s for all indications as a percentage of all deliveries, the anaesthetic intervention number i.e. the sum of regional procedures (spinal, epidural or combined spinal-epidural, CSE) done for labour analgesia and all obstetric operations done in an operating room (including, but not limited to, Caesarean sections, instrumental deliveries and third-stage procedures) and the Obstetric Anaesthesia Activity Index (OAAI), an index based on the number of Caesarean sections and the number of epidurals done in a year.

The OAAI was developed to be able to compare anaesthetic activity between several maternity units which may have very different Caesarean section and epidural uptake rates, and then guide staffing requirements accordingly. The formula for this index is: $[(\text{yearly number of LSCS} \times 1.5) + (\text{yearly number of epidurals} \times 0.75)] / 365$ and assumes that on average a LSCS takes 90 minutes and setting up epidural analgesia 45 minutes.⁴

RESULTS

There were 4040 deliveries at MDH in 2019.⁵ 1194 lower segment Caesarean sections (LSCS) were

recorded in the obstetric anaesthesia logbook and this translates into a Caesarean section rate of 29.6%. 900 (75.4%) LSCS were done under a spinal anaesthetic, 191 (16%) using an epidural top-up and 103 (8.6%) under general anaesthetic. This means that 91.4% of all LSCS were done under a regional anaesthetic.

A total of 966 spinal anaesthetics were carried out. The absolute majority (907, 94%) were for a LSCS and 7 of these failed to provide surgical anaesthesia

and had to be converted to a general anaesthetic. 59 (6%) were done for other procedures such as manual removal of the placenta and perineal tear repair (see table 1). 13 spinal anaesthetics (1.3%) were carried out after an epidural had already been inserted for labour analgesia but was deemed insufficient for a surgical intervention: 9 of these cases were for a LSCS and another 4 for a perineal tear repair.

Table 1: Distribution of spinal anaesthetics by surgical procedure

Procedure	Number of patients	Percentage
LSCS	907	94.0%
Perineal tear repair	40	4.0%
Manual removal of placenta	17	1.8%
Haematoma exploration	1	0.1%
Examination under anaesthesia	1	0.1%

1064 epidural catheters were inserted for labour analgesia and this results in 26.3% epidural uptake rate for 2019. 211 epidurals done for analgesia (19.8%) were used successfully to provide anaesthesia for a surgical operation, mostly (191) a LSCS (see table 2). No combined spinal epidurals were recorded for either labour analgesia, LSCS or any other operative intervention. The total number of women who received regional anaesthetics was 2017 and the regional anaesthetic rate works out at 49.9%. Very few regional techniques had to be converted to a general anaesthetic: 16 epidurals and 7 spinal anaesthetics. The conversion rate of regional to general anaesthesia works out at 1.1%. These were all cases requiring a LSCS.

There were 109 parturients who required a general anaesthetic and the absolute majority of these (103, 94.5%) were for a LSCS. In 6 cases (5.5%) a general anaesthetic was administered for other procedures (see table 3).

The number of women who received anaesthetic care stood at 2103 (52.1% of all deliveries) of which 247 (11.7%) received two anaesthetic procedures (table 4). None received more than two anaesthetic intervention. Hence the anaesthetic intervention number for 2019 was 2350. The Obstetric Anaesthesia Activity Index was 7.09.

Table 2: Distribution of epidural catheters inserted by procedure. EFL: epidural for labour; LSCS: lower segment Caesarean section; PTR: perineal tear repair; IVD: instrumental vaginal delivery; MROP: manual removal of placenta; SA: spinal anaesthetic; GA: general anaesthetic.

Procedure	Number of cases	Percentage
EFL only	824	77.44%
EFL topped up for LSCS	191	17.95%
EFL topped up for PTR	15	1.41%
EFL topped up for IVD	3	0.28%
EFL topped up for MROP	2	0.19%
EFL converted to SA for LSCS	9	0.85%
EFL converted to SA for PTR	4	0.38%
EFL converted to GA for LSCS	16	1.5%

Table 3: Distribution of general anaesthetics administered by procedure. Bakri balloon: an intrauterine device used in the management of postpartum haemorrhage by rapid providing tamponade in the uterine cavity.⁶

Procedure	Number of cases	Percentage
LSCS	103	94.5%
Manual removal of placenta	4	3.7%
Perineal tear repair	1	0.9%
Bakri balloon insertion	1	0.9%

Table 4: Distribution and description of women who received two anaesthetic procedures. EFL: epidural for labour; GA: general anaesthetic; SA: spinal anaesthetic.

Procedures	Number of cases	Percentage of women received anaesthetic care
EFL then topped up (for any surgery)	211	85.4%
EFL converted to a GA	16	6.5%
EFL converted to SA	13	5.3%
SA converted to GA	7	2.8%
Total	247	100%

DISCUSSION

The number of deliveries in Malta has remained at just over 4000 deliveries every year since 2011. The maternal characteristics reflect a shift to an older age at the time of giving birth and the rapid population expansion due to immigration experienced in Malta recently: in 2018 36.8% of deliveries were in 30 to 34 years age group and 24.5% were non-Maltese nationals.⁷⁻⁸

The Caesarean section rate observed in this study (29.6%) is comparable to the average observed in southern Europe (30.7%).¹ At 91.4%, regional anaesthesia uptake (i.e. administering a spinal anaesthetic or topping up an epidural) for Caesarean delivery is very good and compares well to the Royal College of Anaesthetists (RCoA) and Obstetric Anaesthesia Association (OAA) standard.⁹ However, the type of anaesthetics administered according to urgency of the case could not be described as this is rarely documented. Regional anaesthesia for elective LSCS (category 4) should be above 95% and more than 85% for urgent cases (category 1 to 3, which are defined as 1: threat to the life of woman or foetus, 2: no immediate threat

to life of woman or foetus, 3: early delivery required).¹⁰ The RCoA/OAA definition for the rate of conversion from regional to general anaesthesia for LSCS includes all regional anaesthetics attempted, irrespective whether or not they were used for an operation, since procedures carried out to provide analgesia should be reliably converted to provide surgical anaesthesia. This is why our conversion rate works out at 1.1%.⁹

The epidural uptake at 26.3% is similar to that observed at the MDH CDS in previous years: 26% in 2014 and 28.4% in 2017.^{11,12} However, these figures were the result of studies involving data collected over a few weeks and did not take into account all epidural catheters inserted for 2014 or 2017. In contrast, this exercise included all epidurals done in 2019. Therefore, the epidural uptake rates for 2014 and 2017 could be approximations. The 26.3% uptake is also lower than rates reported abroad: 31% in UK, 37.2% in France and 65.1–73.1% in the US.^{13,14,15} It must be noted that these are national averages and a great deal of variation exists between different centres within larger countries. In one European study, the epidural uptake rate

ranged from 0 to 98%, depending on the type of delivery unit, the level anaesthetic support available and the case load complexity.¹⁶

The OAAI was developed in Israel to address anaesthetic staffing inadequacies within maternity units. OAAIs for Israeli obstetric units in 2007 ranged from 1.97 to 24.14. Our OAAI of 7.09 roughly translates to 6 to 7 anaesthetic interventions per day and suggests a moderately busy delivery suite at MDH.⁴

There were a few limitations to this study. Data was collected for only one year, and therefore the results do not describe any trends in obstetric anaesthesia over a longer period of time. It relied entirely on one source of data, that is the obstetric anaesthesia procedures logbook, and if for some reason an anaesthetic intervention was not documented in it, then it was missed in this study and the numbers quoted above may involve a slight underestimation. In fact, the official MDH surgical activity report for 2019 lists 1220 Caesarean sections, a discrepancy of 6 such deliveries. Even though the obstetric anaesthetist is meant to record all LSCS occurring during his/her on-call in the logbook, including those carried out in the Major Operating Theatres (and therefore, outside the CDS), some of these could have been missed.¹⁷

Also, the level of urgency of operative cases was very rarely described in the obstetric anaesthetic logbook. This is especially true for LSCS: very few cases had their category documented. This makes it impossible to describe in detail regional anaesthesia uptake by LSCS category and the conversion of regional to general anaesthetics. Finally, this study focused only on procedures to provide anaesthesia and analgesia, however, anaesthetists contribute much more in obstetric care, including the assessment of high-risk parturients and the planning of their delivery, post-procedure reviews,

management of critically ill women both in the CDS and the ICU and support with vascular access. Drawing conclusions on obstetric anaesthetic workload based on anaesthetic procedures alone, as also described by the OAAI, does not give an accurate and full description of the anaesthetist's role in a maternity unit.

This study sheds light on what other initiatives can be carried out to further evaluate and improve the obstetric anaesthesia service. Firstly, an effort should be undertaken to ascertain the quality of the data being recorded and if this matches other hospital data-collection systems such as operating theatre records. Anaesthetists should be encouraged to document cases in more detail, especially the level of urgency of the cases undertaken, as this would then give more in-depth information on the anaesthetics administered to parturients in our unit, especially the variations in practice dictated by the urgency of delivery. A joint effort between obstetricians and anaesthetists should be undertaken to categorize LSCS (categories 1 to 4). Also, a system to electronically record epidurals and the complications arising from them should be implemented. This would then make it much easier to monitor and regularly audit the epidural analgesia service. Given a comparatively low rate of epidural uptake, women's perception of epidural analgesia in Malta is another area of possible investigation, especially to see if there are any perceived barriers to access timely and safe epidural analgesia.

CONCLUSION

With 2350 anaesthetic interventions in obstetrics, anaesthetists were actively involved in the care of over half of all parturients at MDH in 2019. This confirms the wide and considerable role anaesthetics has in maternal services provided at

MDH and should prompt continued allocation of personnel, technical resources and regular training and audit programmes for all doctors and allied health professionals involved.

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