International Journal of Obstetric Anesthesia (2009) **18**, 352–355
0959-289X/$ - see front matter
doi:10.1016/j.ijoa.2009.02.013

ELSEVIER
www.obstetanesthesia.com

ORIGINAL ARTICLE

An observational study of anaesthesia and surgical time in elective caesarean section: spinal compared with general anaesthesia

S. Ismail, A. Huda
Department of Anaesthesia, Aga Khan University Hospital, Karachi, Pakistan

ABSTRACT

Background: Neuraxial techniques are increasingly used in obstetric anaesthesia. In our hospital, time constraints are the main problem when planning anaesthesia for elective caesarean section. Neuraxial anaesthesia is believed to take longer than general anaesthesia. The objective of this prospective, observational study was to compare time to surgical readiness and total operating room time with spinal with general anaesthesia for elective caesarean section at a Pakistani university hospital for a period of six months.

Methods: Two hundred and forty-five patients receiving either general or spinal anaesthesia were studied. The times of arrival and leaving the operating room, the start and completion of anaesthetic induction, surgical readiness, incision and completion of surgery, were noted.

Results: The times for surgical readiness (general: 16.8 ± 5.4 vs. spinal: 21.1 ± 8.2 min), anaesthesia (general: 4.5 ± 1.4 vs. spinal: 8.1 ± 3.8 min) and surgery (general 50.8 ± 12.3 vs. spinal 54.8 ± 14.0 min) were longer in the spinal group, but emergence time (general: 12.2 ± 4.3 vs. spinal: 7.3 ± 2.7) was longer for general anaesthesia. No significant difference was found in the total operating room presence between the two groups (general 76.6 ± 14.4 vs. spinal 76.3 ± 16.3 min).

Conclusion: In our hospital, the use of spinal anaesthesia was not associated with decreased intra-operative time efficiency compared to general anaesthesia for elective caesarean section.

Keywords: Anaesthesia time; Surgical readiness; General anaesthesia; Spinal anaesthesia; Caesarean section

Introduction

The caesarean delivery rate has been increasing steadily over the past decade with the current trend favouring neuraxial over general anaesthesia, because of the fear of airway complications with the latter.[1–3] Nevertheless, there is a concern that spinal anaesthesia may take too long to perform and is associated with a known failure rate.[4,5]

In our hospital, time constraints are the main problem when planning a neuraxial technique even for elective caesarean section. Obstetricians believe that neuraxial techniques take more time in preparation and administration, thereby leading to longer operating room presence, slower patient turnover and fewer cases performed during working hours. Moreover, obstetricians complain that due to the large time gap between spinal induction and surgical incision, the interval when the fetus is not monitored may be extended. These general impressions cause obstetricians to counsel their patients that they should receive general anaesthesia. The lack of patient awareness and education in our part of the world leads to fear of complications such as paralysis with neuraxial techniques and complete reliance on the obstetrician to make decisions. A secondary result of these impressions is that our trainees have less experience with neuraxial techniques than those in the US and UK,[6,7] possibly more in line with those in France over ten years ago, one study reporting a marginally higher rate of general than for neuraxial anaesthesia for scheduled caesarean section (49.7% vs. 48.4%).[8] The authors stated that the time-saving aspect of general anaesthesia was probably an important factor in this choice.[8]

The aim of our audit was to observe the effect of spinal vs. general anaesthesia on the times for surgical readiness and total operating room presence.

Accepted February 2009
Correspondence to: Samina Ismail, Assistant Professor, Department of Anaesthesia, Aga Khan University Hospital, Stadium Road, P.O. Box 3500, Karachi 74800, Pakistan. Tel.: 4930051/4331/4631.
E-mail address: samina.ismail@aku.edu

Methods

This prospective, observational study examined elective caesarean sections performed under spinal or general anaesthesia from November 2005 through April 2006. We included all ASA I or ASA II patients. Six categories of practitioners provided anaesthesia: residents from level one to four (R1-R4), fellows/instructors and consultants. A second anaesthetist not involved in performing the clinical procedure collected the following times (recorded according to the operating room wall clock):

1. Arrival in operating room
2. Start of anaesthesia (start of back scrubbing or pre-oxygenation)
3. Induction complete (adequate level of block to cold or confirmation of correct endotracheal tube placement)
4. Incision
5. Surgery complete and dressings applied
6. Departure from operating room

The time intervals are given in Table 1. It is the practice of all obstetricians in our hospital to prepare and drape the patient before the induction of general anaesthesia, even for an elective caesarean section. By contrast, for spinal anaesthesia, patients are prepared and draped after the administration and confirmation of anaesthesia. To overcome this problem, we calculated the times for anaesthesia (time from start of anaesthesia to induction complete) and overall time to achieve surgical readiness (arrival to incision time), instead of a time for induction (arrival to induction complete), which is a typical measure of anaesthesia efficiency. For the same reason, surgical time was measured from incision time instead of from induction complete to end of surgery, which is taken when the last dressing was applied.

Statistical analysis

Statistical analysis was performed by Statistical Package for Social Sciences (SPSS version 15.0). The time intervals in the two groups were compared using the independent t-test. $P < 0.05$ was considered statistically significant.

Results

During the six-month study period, a total of 245 patients were anaesthetised for elective caesarean section in the obstetric operating room and all were included in our study, with 104 receiving general and 141 receiving spinal anaesthesia. Most of the anaesthetics were performed by level R2 residents (Table 2) with no difference between levels of anaesthetist in the type of anaesthesia used.

Although anaesthesia time, time to surgical readiness and surgical time were significantly shorter with general anaesthesia, emergence time was shorter with spinal anaesthesia and total time in the operating room was not significantly different (Table 3).

Discussion

There is a widespread perception that anaesthesiologists can decrease operating room costs and time by working more quickly. Dexter and Macario,[9] using a Monte-Carlo computer simulation, showed that decreasing case duration by anaesthetic or surgical interventions is unlikely to create sufficient operating room time to permit an additional case to be completed during working

Table 1 Definitions of time intervals

- *Anaesthesia time*: start of anaesthesia to induction complete
- *Time to surgical readiness*: arrival in operating room to incision
- *Surgical time*: incision to surgery complete
- *Emergence time*: surgery complete to patient leaves operating room
- *Total time in operating room*: arrival in to departure from operating room

Table 2 Techniques of anaesthesia and level of anaesthetist

Anaesthetist level (total anaesthetics) (n = 245)	General anaesthesia (n = 104)	Spinal anaesthesia (n = 141)
R1 (4)	1 (25%)	3 (75%)
R2 (173)	73 (42.2%)	100 (57.8%)
R3 (34)	15 (44.1%)	19 (55.9%)
R4 (27)	15 (55.6%)	12 (44.4%)
Fellow/instructor (2)	0	2 (100%)
Consultant (5)	0	5 (100%)

R1-R4: resident level.;
There were no significant differences between grades of anaesthetist in the types of anaesthesia used.