Comparative Study of Time Taken to Produce Surgical Readiness Between Spinal Anaesthesia and General Anaesthesia for Emergency Caesarean Section — H Brathwaite

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Curriculum vitae

Hugh was educated in the Cape; he matriculated at the Diocesan College and obtained the MBChB from Stellenbosch University (the Karl Bremer Hospital). After a period as medical officer at the Frere Hospital he joined a private group practice in East London in 1968 in which he is still active. Hugh continued post-graduate education, and he has obtained a DA(SA)-SA College of Medicine, as well as the MFGP and MPraxMed (Medunsa). He is a member of the Academy of Family Practice (since 1978) and actively involved in Vocational Training as well as a part-time lecturer for the MPrax-Med at Medunsa.

Summary

An attempt is made to show that a spinal anaesthetic (SA) can be administered as quickly as a general anaesthetic (GA). It is therefore an appropriate alternative to GA for emergency caesarean sections (ECS) and shows a surprisingly rapid onset of action. Spinal Anaesthesia is not contra-indicated for, and does not delay the time taken to induce surgical readiness in emergencies.

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KEYWORDS:
Caesarean Section; Anaesthesia, Spinal; Anaesthesia, General; Emergencies; Time Factors.

Introduction

The purpose of the study was to compare the time taken to induce surgical readiness between the two recognised standard methods of anaesthesia in emergency caesarean section ie Spinal (sub-arachnoid) and General Anaesthetic.

I believe that spinal anaesthetics are better for the mother and the baby and this belief is supported in the literature.[1,2,3]

The advantages are:

1. Near elimination of the principal hazards of an aspiration pneumonia and failed incubation;
2. Avoidance of drug induced neonatal depression.
3. Maintenance of inter villous placental blood flow;[5]
4. Maternal and paternal participation in the birth;
5. Awake and pain-free postoperative period (particularly useful in diabetics);
6. Facilitation of early breast feeding and maternal bonding;
7. Less bleeding and less deep vein thrombosis post-operatively;[6]
8. No pollution of the theatre with volatile gasses;
9. Improved Neurobehavioural pattern of the neonate;[7]
10. Easy technique and inexpensive material;
11. Good muscle relaxation.

Disadvantages:

1. 15% incidence of spinal headache.[6]
2. Sudden hypotension in 20% (easily corrected with Ephedrine).[6]
3. Uncertain levels of anaesthesia, either too high or inadequately low.
4. Failure rate of 4%.[6]

Contra Indications

1. Maternal resistance
2. Coagulation defects (severe pre-eclamtic haemorrhage and drugs)
3. Massive haemorrhage or uncompensated shock.
4. Bacteraemia (possibility of infected extradural haematoma)
5. Major spinal defect.

Many doctors in our region seem to have the impression that a spinal takes too long and I have often been told by a surgeon that: "a spinal is fine but this is an emergency so please give a General Anaesthetic".[4]

. . . Spinal vs General Anaesthesia

- Removal of needle – sterile gauze pad immediately after
- Lie back on table
- Left lateral tilt 15%
- Administration of 100% oxygen until birth of baby
- Pitocin bolus 10µ IVI + 10µ in drip

General Anaesthetic

- Preoxygenate with 100% oxygen
- Induction dose of Pentothal
- Scoline 100mg/cricoid pressure
- Intubation
- Ventilation
- 50% 0_2 N_20 and 0,5% Halothane
- Relaxation with Scoline drip
- Pitocin bolus IVI + 10µ drip after delivery of baby and clamping cord
- Doperidol 2,5mg + Fentanyl 100mg

The various surgeons and theatre staff were encouraged, at all times to be prepared for, and have, all material and drugs ready and available so that there were minimal avoidable "technical" delays.

Recognising my bias toward favouring spinal anaesthetic, I attempted: to guard against biased measurement and experimenter bias by using:

a) trained observers ie two anaesthetic nurses, one at Frere Hospital and one at Cecelia Makiwane Hospital plus a trained anaesthetist at CM Hospital and myself.

b) When doing measurements of time, we used a stop watch, the nurse starting and stopping the watch on command from the anaesthetist.

(c) My measurements were then compared to control groups consisting of anaesthetics done in the two different hospitals by other anaesthetists at times when I was not present.

The other investigators and patients were not aware of the purpose of the study and the time measured was unambiguous ie from injection of agent to skin incision. This time was concealed by an extra measurement of time until skin closure was completed.

The difference in time between the 25 patients in the SA group compared to the 25 in the GA group is given by the difference in the time between the two means and standard deviations.

If the mean time taken for spinal was more than 300 seconds longer than for the general anaesthetic it would build a case for it being a statistically and clinically significantly slower method.

Analysis was done with the help of the Epi Info 5 programme.

Result

Twenty five (25) patients in each group who met all the inclusion criteria were timed and assessed after being randomly allocated to each method alternatively after 3 exclusions due to delay in draping, 2 waiting for faulty instrument packs to be changed and one for a spinal which failed and was converted to GA; six in all.

The times were measured in seconds. Results are summarised in Table 1. The additional controls were used as a check on reliability and observer bias.

Table 1. Summary of Results

Study Group	No Cases	Fastest	Slowest	Mean	Standard Deviation
GA	25	245 sec	380 sec	306,67	±41,12
Spinal	25	220 sec	370 sec	295,00	±42,08
Comparing the means of the study group gave a P Value 0,40					
The standard deviations are also similar					
Controls additional groups					
GA CMH	11	245	375	306,82	40,51
GA Frere	4	270	395	321,07	39,96
Spinal CMH	11	245	375	308,65	33,84
Spinal Frere	3	290	340	314	25,00
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The study therefore shows beyond doubt that a spinal is *not* significantly slower than a general anaesthetic in obtaining surgical readiness and is, therefore, not contra-indicated in an emergency *on the grounds of time alone.*

In this study the mean for SA was 295 seconds compared to GA with a mean of 306,82 sec. In practical terms, the study shows that surgical readiness is produced in both methods in a shorter time than it takes to prepare and drape a patient.

Discussion

Spinal or Subarachnoid block for lower uterine caesarean section is an easily mastered technique and the modern sterile pre-mixed heavy marcaine 0,5% is the safest and most realiable anaesthetic agent at present.[6] A dose of 2,0 to 2,5cc given at level of L3-4 will give anaesthesia to level of T6 in 96% of patients.[4] Of these

. . . a general impression that a spinal takes too long for an emergency

patients, probably 15% will get a spinal headache lasting for 1 to 5 days. Twenty (20) out of a hundred (100) will get a drop in blood pressure which is correctable by the use of 50mg Ephedrine IV repeated if necessary as an infusion. The mothers are not exposed to the risk of aspiration and they bleed less and develop less post-operative blood clotting.[1] The neuro-behavioral pattern of the babies will be better with a spinal anaesthetic.

Post-operative pain control lasts for up to 4 hours[4] and mothers can eat and breastfeed after the operation and bond with their babies and celebrate the joy of birth with their husbands and family.

However, things can go very wrong with a spinal anaesthetic and a 4% failure rate necessitates a change to a GA with intubation. The occasional "high" spinal requires instant

A doctor must be competent in GA and in resuscitation before attempting a SA

assistance with breathing. A drop in blood pressure can be highly dangerous[4] and patients have died of this, so its early recognition and treatment is of paramount importance. The blood pressure, pulse and oxygen saturation must be routinely monitored.

This means anaesthetic skilfully performed and closely monitored, with a high degree of expectation of trouble, must be the best form of anaesthetic for the mother if holistically applied.

If these criteria are met and indications and contra-indications are strictly adhered to, spinal anaesthetic is the method of choice in emergency caesarean section.

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