TITLE: INCIDENCE OF POST DURAL HEADACHE (PDH) AFTER SUBARACHNOID BLOCK FOR POSTPARTUM TUBAL LIGATION (PPTL): COMPARISON OF 26 VS 30 GAUGE NEEDLES.

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Introduction: PDH is a common complication of spinal anesthesia, especially in obstetrics. The incidence of PDH decreases with smaller diameter spinal needles. This study explores the ease of placement and PDH incidence using a new fine (30 gauge) Quinke spinal needle for PPTL.

Methods: With IRB approval and informed patient consent, 34 patients, ASA I/II, received subarrachnoid block for elective PPTL. The patients were randomly divided into two study groups. In group I, a standard 26 gauge Quinke spinal needle was used. In group II, a new experimental 30 gauge spinal needle was employed. Patients were placed in either the lateral decubitus or sitting position. Skin preparation was with povidone iodine 5% aerosal spray followed by vigorous removal of this solution using sterile saline and sponges. The recorded time from skin skin wheal infiltration to subarachnoid injection reflected the ease of block placement. The 26 gauge spinal needle was introduced through a standard 18 gauge introducer. The 30 gauge needle was introduced intrathecally with the aid of a short (7.5 cm) Tuohy needle first used to identify the epidural space using loss of resistance to air. Needle bevel orientation was always lateral. CSF flow was recognized in all cases prior to injection of local anesthetic. Patient BP and sensory level were monitored every two minutes for the first 20 minutes and then every five minutes thereafter. Hypotension was treated with increased IV fluids and ephedrine. After surgery, ambulation was allowed following complete resolution of sensory/motor block. Patients were visited daily in hospital postoperatively for questioning and examination for PDH. Each patient was telephoned 6-7 days after dismisal and asked about PDH.

Results: 34 patients have been studied thus far, 17 in each trial group, with 4 exclusions. Of the remaining 15 participants in each group, no significant statistical differences were found between the two study groups for age, height, weight, BSA, local anesthetic dose, or time to onset of blockade. 3/15 (20%) of patients in group 1 manifested signs and symptoms consistent with mild to moderate but self-limiting PDH in the first 72 hours. No patient entering group II has as yet complained of PDH. This difference eludes statistical significance due to small sample size. Time to placement of the spinal needle was longer with the 30 gauge group (12.0 ± 2.6 min) than with the 26 gauge group (3.8 ± 0.6 min)[$p<0.05$]. Only in the 30 gauge needle group was time to needle placement, an indicator of technical difficulty, directly related to BSA ($R=0.734$, $p<0.01$).

Discussion: Our incidence of 20% PDH using 26 gauge spinal needles equates with that of others.[1,2] The current zero incidence of PDH using 30 gauge spinal needles is consistent with the findings of Flatten[3] who used a similar fine (29) gauge Quinke spinal needle in young adult male and female patients. He describes using an introducer needle too, but makes no comment regarding ease of needle placement. Our data to date suggest that, though a decrease in PDH may be achieved with 30 gauge spinal needles, their use may delay operation.

References

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TITLE: TRANSPORT OF THIOPENTAL (STP) ACROSS THE PERFUSED HUMAN PLACENTA

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Introduction: Present knowledge of the effects of maternally administered anesthetic agents on the fetus/neonate is derived mainly from single point determinations of maternal and fetal/umbilical blood samples at birth, or indirectly via fetal and cord blood gases or early neonatal neurobehavioral scoring. But these methods neglect the placenta as a dynamic, metabolically active organ capable of influencing the fetal environment. Inaccessibility and concerns over fetal and maternal safety have so far limited direct *in situ* placental studies. A dual perfused human placental lobule system has previously been developed.[1] Its reliability as a model of the *in vivo* placenta has been verified locally for both biochemical and physiological functions. Though this model has been used to study the pharmacokinetics of various drugs, it has never been applied to the placental transport of anesthetic agents. We proposed to use it to study the maternal-to-fetal and fetal-to-maternal transport of STP, and whether the placenta sequesters or metabolizes significant amounts.

Method: Term human placentae were perfused immediately after delivery via an umbilical artery with cold Krebs-Ringer buffer solution and heparin. An artery and vein suppling a cotyledon free from lacerations and tears, was cannulated with polyethylene tubing. The placenta was mounted in a plexiglass chamber and positioned to expose the maternal face of the cotyledon. The maternal intervillous spaces was perfused by placing three 19-gauge spinal needles 2-3 mm below the maternal plate. The perfusing solution used throughout each experiment was a mixture of Krebs-Ringers buffer at pH 7.4 and human albumin (2g/100ml). The temperature of the preparation and perfusate was maintained at 37°C. Perfusion pressure was maintained at 40-60 mmHg to maintain maternal and fetal flow rates of 2-4 ml/min and 20 ml/min, respectively. The perfusate was equilibrated with 21% O_2 and 5% CO_2 gases. pH was maintained at 7.4 by regulating the CO_2 concentration of the system.

Individual variability exists among placentae. Therefore transport of STP was compared with the transport of antipyrine, a freely diffusible and non-metabolized transport marker. This allowed for the expression of transfer STP as either a transport or clearance index, i.e., STP/antipyrine transport or clearance, respectively. These studies were performed in both reperfusing and non-reperfusing systems using initial concentrations of STP of 40 mcg/ml. STP [and its metabolite(s)] and antipyrine analyses were performed with HPLC and liquid scintillation, repectively.

Results: In the non-reperfusing system, transport index was 1.29 ± 0.04 for maternal-to-fetal transfer ($n=3$) and 0.73 ± 0.06 for fetal-to-maternal ($n=3$) transport. Our preliminary results using the non-reperfusing system appear to confirm these findings with a steady state clearance index of 0.95 ± 0.001 for maternal-to-fetal ($n=2$) and 0.79 for fetal-to-maternal ($n=1$) transfer. STP is not metabolized to pentobarbital by the placental cotyledon. Preliminary findings suggest a greater retention of STP by the placenta after fetal-to-maternal perfusion than vice-versa.

Discussion: These findings suggest an asymetric handling of STP by the human placenta favoring fetal accumulation. Whether the greater placental sequestration for fetal-to-maternal perfusion represents facilitated transport or non-specific binding is at present unknown. The clinical significance of these observations is presently unclear and will require further investigation.

Reference

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