ASA ABSTRACTS

A829

Title: PHARMACOKINETICS OF ROPIVACAINE AND BUPIVACAINE IN PREGNANT EWEs

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Ropivacaine is a new amide local anesthetic
which appears to hold promise for obstetric use.
It is similar to bupivacaine in its potency and
duration of action, but its cardiotoxicity is less
and not enhanced by pregnancy (1). The present
study compares the pharmacokinetics of ropivacaine
(R) and bupivacaine (B) in pregnant sheep.

Pregnant ewes, near term of gestation, had
intravascular catheters inserted under general
anesthesia. After 4-5 days, each ewe was given, in
random sequence, 2 intravenous infusion regimens,
separated by a one day interval: (1) ropivacaine
0.2 mg.kg\(^{-1}\).min\(^{-1}\) for 15 min followed by 0.075
mg.kg\(^{-1}\).min\(^{-1}\) over 45 min, (2) bupivacaine, 0.1
mg.kg\(^{-1}\).min\(^{-1}\) for 15 min followed by 0.058
mg.kg\(^{-1}\).min\(^{-1}\) over 45 min. These infusions were
chosen in order to avoid toxicity. The ewes' heart
rate and arterial blood pressure were monitored
throughout. Arterial blood samples were obtained
prior to, at 15 min, the end of infusion (60 min),
and at intervals up to 300 min thereafter.
Following determination of blood pH and gas
tensions, samples were centrifuged, plasma
separated and frozen until drug analyses using gas
chromatography (limit of sensitivity 5 ng.ml\(^{-1}\))
"SIMPLEX", a nonlinear regression computer program,
was used to derive pharmacokinetic indices. Paired
Student’s "t" test or ANOVA were applied to detect
statistically significant differences (p<0.05).

Results are expressed as the mean±SD.

Five animals have been studied thus far. All
were in good general condition throughout the
experiments. Infusion of either local anesthetic
did not alter the ewe's heart rate, mean arterial
blood pressure, pH or gas tensions. The plasma
concentrations of R and B at the end of infusion
were similar, 2.2±1.0.47 and 1.8±0.21 µg.ml\(^{-1}\),
respectively. By 300 min these had declined to
0.2±0.09 µg.ml\(^{-1}\) for R and 0.2±0.05 µg.ml\(^{-1}\) for B.
The elimination half-life (T\(\beta\)) of R was
significantly shorter, 104±25 vs 129±23 min for B.
The volumes of distribution at steady state (V\(\text{dss}\))
were similar (3.6±1.2 and 2.8±0.8 L.kg\(^{-1}\)).
There was a trend toward a faster clearance (CL) for R
then B, 25±13 vs 17±6 ml.min\(^{-1}\).kg\(^{-1}\), but this
difference failed to achieve statistical
significance (p=0.06).

These data indicate that, in pregnant ewes, R
has a shorter T\(\beta\) than B, probably due to a faster
CL. Similar findings were obtained in nonpregnant
volunteers (2). Assuming the results of our study
are applicable to pregnant women, repeated
injections of R should result in lower accumulation
than with B.

References

A830

TITLE: AN IN-VITRO ASSESSMENT OF AMNIOTIC FLUID REMOVAL FROM HUMAN BLOOD THROUGH CELL SAVER PROCESSING

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Introduction:
Major obstetric hemorrhage accounts for approximately 13.4%
of maternal mortality in the United States. 1 The risks associated
with transfusion of non-autologous bank blood include infection
e.g., hepatitis, AIDS, Yersinia enterocolitica), transfusion
reaction, and Rh sensitization. 2 Massive intrauterine
obstetric hemorrhage may risk amniotic fluid contamination
from the surgical field. Amniotic fluid (AF) may contain lanugo
hair, vernix caseosa, meconium, and fetal cellular debris.
These may potentially cause cardiovascular collapse and/or
DIC if significant quantities enter the maternal circulation. 3

Patients with clinical symptoms of Amniotic Fluid Embolism
(AFE) tend to have higher quantities of fetal debris in their
circulation than non-affected patients. 4 By using the cell saver
wash cycle APF may be effectively reduced or eliminated.
This in-vitro study was designed to determine if the Shiley
Dideco 795 P Cell Saver could adequately clear gross amniotic
fluid from human blood.

Methods:
Sterile amniotic fluid was obtained from healthy ASA I and II
parturients undergoing elective cesarean sections. Six samples
of amniotic fluid in concentrations of 20% and 35% were mixed
with outdated whole bank blood and six samples of amniotic fluid
in concentrations of 20% and 35% were mixed with fresh
whole blood from patients with hemochromatosis. These
samples were passed through a 40 micron cardiomyocyte filter,
primed at 300 cc/min, and washed with 2 liters of normal saline
using the Shiley Dideco 795 P cell saver. Post-wash samples
from the bank blood mixture and pre and post-wash samples
from the fresh blood mixture were tested for alpha fetal protein
(AFP) concentrations (Kallestad AFP OB Radioimmunoassay
with a maximum sensitivity of 2.2 international units per
milliliter). Cell smears for fetal squamous cells were performed
using Giemsa Wright staining.

Results:
Six pre-wash samples with 20% and 33% AF had AFP levels
which ranged from 36-83 international units per milliliter. All
twelve post-wash samples had alpha fetal protein levels of zero.
Pre-wash Giemsa-Wright Staining had cell concentrations
ranging from 8.6-39 squares per 4 microliter, whereas post-
wash cell concentrations ranged from 1.5-15 squares per 4 microliters.
No trophoblasts, lanugo hair, or vernix caseosa were
seen.

Conclusion:
We conclude that when AFP and fetal debris are used as
markers for AF, cell saver processing appears to completely
remove AF and reduce the quantity of fetal debris. Presently, it is
unclear which markers or substances within AF are the etiologic
triggers responsible for the signs and symptoms of AFE. 5

References:
Boston, MA.
Louis MO.
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