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Title : EFFECTS OF PLACENTAL TRANSFER OF GLYCOPYRROLATE

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Introduction. Glycopyrrolate is a quarternary ammonium compound with anticholinergic properties and potency similar to those of atropine (1). Atropine is known to cross the placenta producing changes in fetal heart rate. While animal studies have demonstrated lack of placental transfer of glycopyrrolate (2), the present study was undertaken to determine the effects of this agent on the human parturient and fetus.

Methods. Twenty patients in labor with no obstetric complications were studied. Informed consent was obtained and the study was approved by the Research Committee of the Professional Staff Association and University of Southern California Health Sciences. All patients had direct fetal heart rate monitoring and uterine pressure was measured by an intrauterine catheter. Maternal heart rate was calculated from precordial electrocardiograms and maternal blood pressure was recorded using sphygmomanometer. All patients were placed in the lateral position during the entire period of the study. The following data were recorded in all patients: fetal heart rate, beat to beat variability, uterine activity, maternal heart rate, beat to beat variability and blood pressure. Following a thirty minute observation period, glycopyrrolate, .002 mg/lb, was given as an IV bolus through the rubber tubing of the infusion set and monitoring continued for another 30 minutes.

Results. There were no significant changes in fetal heart rate in any patient and there were no abnormal patterns, also there were no changes in fetal heart rate beat to beat variability. Variability of the fetal heart rate is thought to denote the physiologic integrity of the pathway from the cerebral cortex through the cardiac center in the medulla oblongata, the vagus nerve and the cardiac conduction system. Any factor which alters the integrity of this pathway will cause a decrease in variability. Uterine activity increased in a normal manner. The maternal heart rate increased in all patients. The onset of tachycardia was from one to two minutes with a peak effect at ten to twenty minutes. The increase in maternal heart rate ranged from 16 to 46 beats per minute with a mean of 27.3 $\pm$ .84. There were no significant changes in maternal blood pressure. The maternal heart rate beat to beat variability decreased in all patients.

Discussion. These results indicate that glycopyrrolate does not cross the placenta to any significant degree. They also indicate that the maternal cardiovascular effects of glycopyrrolate are comparable with those previously reported with atropine. Administration of an agent which changes the fetal heart rate (FHR) is undesirable since it may mask the FHR parameters which one used to diagnose fetal distress. Therefore, it seems reasonable that when anticholinergic drug is indicated, glycopyrrolate is a better alternative than Atropine.

References.

1. Franko BV, Alphin RS, Ward JW, et al: Pharmacodynamic Evaluation of Glycopyrrolate in Animals. ANN NY Acad Sci 99: 131-149, 1962

2. Proakis AG, Harris GB: Comparative Penetration of Glycopyrrolate and Atropine Across the Blood, the Brain Barrier, and Placenta Barrier in Anesthetized Dogs. Anesthesiology 48: 339-334, 1978