Title: EVALUATION OF ATRACURIUM IN CAESARIAN SECTION USING TRAIN-OF-FOUR RESPONSES

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Introduction. Atracurium is a competitive neuromuscular blocking agent which undergoes spontaneous degradation at body temperature and pH by Hofmann elimination[1]. Studies in anaesthetised patients have shown that atracurium in doses of 0.3-0.6mgkg^{-1} produces no cardiovascular effects and that it possesses a significantly shorter duration of action than other presently available drugs of the same type[2]. Furthermore, the neuromuscular blockade produced by atracurium may be fully reversed with neostigmine even if it is given before recovery has begun. Animals studies have shown that this drug does not cross the placenta[3].

Methods. Studies were carried out in 12 patients undergoing Caesarian Section and who had given their informed consent. The approval of the Ethics Committee of the London and Newham Hospitals was obtained. Following pre-oxygenation and the application of cricoid pressure, anaesthesia was induced with methohexitone 80-100mg i.v. Endotracheal intubation was accomplished following the administration of suxamethonium 75-100mg i.v. When neuromuscular activity had returned atracurium approximately 0.3mgkg^{-1} was given to provide surgical relaxation. Anaesthesia was maintained with 50% nitrous oxide in oxygen and 0.2-0.5% halothane to delivery and with 66% nitrous oxide in oxygen with supplements of fentanyl 0.05-0.1mg following delivery. Maternal heart rate and arterial blood pressure were measured non-invasively and ECG was monitored. Train-of-four stimuli (T_4) were produced with a 'Myotest' nerve stimulator using surface electrodes applied over the ulnar nerve at the wrist. The responses of the adductor pollicus muscle were recorded with a force displacement transducer. In the neonate, Apgar scores and time to sustained respiration were noted and neuromuscular activity was assessed by stimulating the ulnar nerve with a blockade monitor.

Results. In these studies suxamethonium was used to achieve endotracheal intubation within 30-45 seconds and atracurium was administered between 3-10 minutes later when twitch height had recovered to 10-20% of the control level. Cardiovascular stability was notable. Analysis of variance of heart rates and mean arterial blood pressures showed no statistical change after the administration of atracurium. In 3 of the 12 patients studied relaxation was adequate for the duration of the procedure as assessed by the T_4 responses (46-50 min). The other 9 patients required a supplementary dose of 0.1-0.2 mg kg^{-1} at a mean of 29.3 ± 4.0 minutes after the initial dose of atracurium. Induced reversal with atropine and neostigmine was required in only 3 of the 12 patients studied. Neuromuscular activity in the newborn was normal as assessed by the responses to single twitch and tetanic stimulation of the ulnar nerve. The Apgar scores at 5 min were 10 in each of 11 neonates. In the remaining case the Apgar score at 5 min was 7 but this was a case of foetal distress and was not attributable to the use of atracurium.

Discussion. Our results show that atracurium provided good relaxation in obstetric anaesthesia. In the pregnant woman cardiovascular stability may be already compromised due to anaesthesia, analgesic drugs during labour, epidural analgesia, and aorto-caval compression, in addition to certain pathological conditions including pre-eclampsia and cardiac disease. Adequate placental perfusion and foetal oxygenation is highly dependent on maternal cardiovascular stability and the absence of cardiovascular effects with atracurium offers a distinct advantage in the obstetric situation. In this study the duration of surgery was variable yet in most patients there was full spontaneous recovery of respiration. In the remainder ease of reversal following a single administration of neostigmine was notable as confirmed by the T_4 responses. This feature of atracurium deserves attention considering that there have been recorded maternal deaths following inadequate reversal and recurarization during recovery. Initial animal experiments indicated that atracurium did not cross the placenta in significant amounts and that neuromuscular activity in the neonate was unimpaired[3]. These findings are supported by similar observations in the human neonate reported in this study.

References.

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