The effect of Atracurium on the pulse rate during rapid tracheal intubation.

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الخلاصة

يعتبر الاتراكيوريوم ديباسيلت من المرخيات المتوسطة العمل حيث يستعمل للعمليات المتوسطة . الهدف من هذا البحث هو معرفة تأثير إعطاء مرخي العضلات (الاتراكريوم ديباسيلت) على ضربات القلب خلال عملية تنبيب القصبة الهوائية بالطريقة السريعة . الطريقة المستخدمة في هذا البحث هي 25 حالة لمختلف العمليات الجراحية بنفس طريقة التخدير لكلا الجنسين في مستشفى الصدر التعليمي في النجف الاشرف.

النتيجة من خلال هذه الدراسة نلاحظ قراءة ضربات القلب قبل التخدير وأثناء التخدير وإثناء الاستمرار بإعطاء التخدير.خلاصة هذا البحث نلاحظ أن تأثير الاتراكريوم على ضربات القلب طفيف لذلك يفضل استخدام هذا الدواء للأشخاص المصابين بأمراض القلب والمسنين.

Abstract

The atracurium dibesilate is intermediate muscle relaxant and has a little effect on heart rate .The aim of this is project is to study the effect of atracurium dibesilate on the pulse rate during rapid tracheal intubation . Materials and method: 25 cases ASA I (American society of anesthesiology .class I) , different surgeries , the same anesthesia technique ,both sexes in AlSader teaching hospital .

Result and discussion: from this study we show reading of pulse rate during three situation (pre-induction – and maintenance of anesthesia) with atracurium dibesilate during rapid tracheal intubation we notice there is not significant changes in pulse rate.Conclusion:from this project we conclude that atracurium associated with little increase in heart rate so it is preferable to be used in patients with heart diseases and elderly patients.

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Introduction

Atracurium dibesilate (rINN)

Atracurium is highly specific, competitive, neuromuscular blocking agent which was designed to undergo spontaneous breakdown at body temperature and at physiological PH by 'Hofmann elimination ', a spontaneous degradation in to inactive fragment [1]. Laudanosine is one of the breakdown products. It is also broken down by ester hydrolysis (see below)[2]. Cardiovascular systems. There is normally little histamine release with recommended doses, although it has been reported . There is also little effect on autonomic ganglia. Bradycardia may , however, occur when vagotonic agents such as halothane and opiates are in use and no antimuscarinic premedication has been given because , like vecuronium , it has no intrinsic antivagal activity[3].

Respiratory system effect are similar to those with other muscle relaxants. There is little risk of bronchospasm[4].

Atracurium may be used in any situation in which other competitive muscle relaxant could used , but is particularly indicated in the presence of renal failure [5]. Its relative lack of cardiovascular effects would also appear to be an advantage in many clinical situation[6].

The initial intravenous dose lies between 0.3 and 0.6mg . The latter dose is necessary when the patient is be intubation ; a smaller dose can used when the drug is given after intubation under suxamethoium[7] . It has a relatively short onset of action , and intubation can be achieved in 1.5-2 minutes with doses of 0.6 mg/kg[8]. The duration of action depends on the action depends on the dose and lies between about 20 and 40 minutes for dose of 0.3-0.6 mg/kg. Supplementary doses of one –third as much extend the duration of action for an equal time. Such dose are not cumulative and have a similar effect[9].

Precautions

Laudanosine has been detected in plasma and has occasioned interest because it is cerebral stimulant[10]. The concentration of laudanosine required to produce convulsion in doge is > 20 Mg/ml; the concentration found after clinical use of atracurium have been between 2 and 14 Mg/ml[11]. Laudanosine is cleared by the liver and its clearance is not affected by concurrent renal failure . It is therefore safe for prolonged use the intensive care unit although the situation in the presence of concomitant hepatic failure has not been studies[12].

The physiological effect of rapid tracheal intubation lead to increase in the heart rate,so the aim of my project is to decrease the effect of increase in the heart rate during rapid tracheal intubation[13].

Patients and Methods

The data of 25 cases ASA(American society of anesthesiologists use in assessing patients preoperatively) typeI,different surgeries, same anesthetic technique(induction of anesthesia intravenously by using sodium thiopentone sleeping dose and maintenance of anesthesia by halothane inhalationaly and atracurium used in dose 0.5 mg\kg[14] without premedication and wait 1.5 to 2.5 minutes after induction of anesthesia to sure complete action of muscle relaxant before tracheal intubation to decrease the risk of increase in the heart rate and measuring pulse rate during one minute after intubation and then measuring pulse rate after 15 to 20 minute during maintenance of anesthesia), both sexes , are analyzed and studied to know the effect of atracurium on the pulse rate during rapid tracheal intubation .Using all the monitoring aids such as ECG monitoring , pulse oximetery , capnography , etc , uses to help us in evaluating our patients during preoperative period . Statistical analysis done to know the significance of these data completely .

Results

The table (1) show 25 cases in different ages , sexes ,and weight and also show the onset of action of atracurium ranged from 1.5 to 2.5 min to sure complete relaxation of the patients when do the intubation to decrease its physiological effect on the heart.

The second table show the changes in the pulse rate during preoperative period , during induction of anesthesia and during maintenance of anesthesia.

Table (1): Different data about the cases related to Atracurium

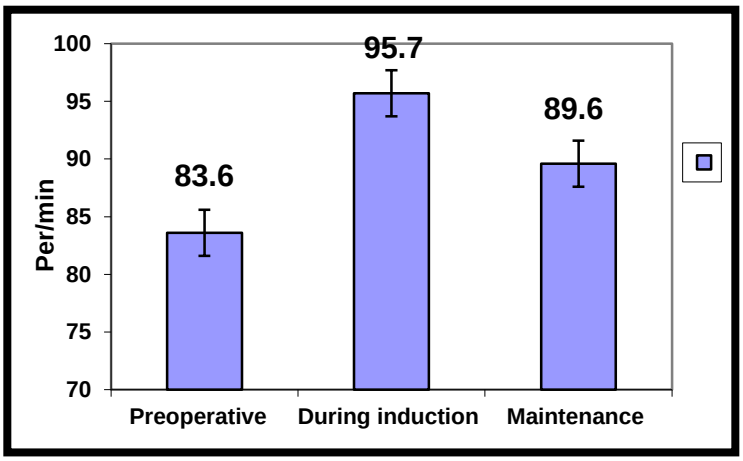
cases	Age (yr.)	Sex	Weight (Kg)	Onset of action(min)
1	23	M	79	2
2	26	F	68	1.5
3	25	F	70	2.5
4	27	M	80	2
5	34	F	70	2
6	32	M	77	2
7	28	M	83	1.5
8	36	M	85	2
9	21	M	75	1.5
10	50	F	74	1.5
11	18	M	60	2
12	20	F	65	3
13	22	F	59	2
14	30	M	77	2.5
15	17	M	68	2
16	20	F	50	3
17	30	M	80	2.5
18	23	M	75	2
19	40	M	70	2.5
20	63	F	75	1.5
21	60	M	78	2
22	50	M	80	2
23	65	F	75	2
24	37	M	70	2
25	22	M	65	2
M±SD	32.76 ± 14.3		72.32 ± 8.16	2 ± 0.42

Table (2): The changes in PR associated with Atracurium administration

Cases	Preoperative P. R. per/min	During induction P.R. per/ min	Maintenance P.R. per/min
1	74	82	80
2	72	86	81
3	76	90	87
4	77	89	84
5	84	100	92
6	70	85	79
7	71	86	82
8	80	95	89
9	86	97	95
10	92	102	96
11	79	90	85
12	87	96	92
13	94	100	89
14	115	120	109
15	80	93	86
16	88	95	91
17	91	98	90
18	90	100	94
19	70	85	81
20	84	98	90
21	89	100	97
22	92	106	96
23	94	99	91
24	79	101	88
25	77	100	96
Total	2091	2393	2240

Parameter	Preoperative P.R. per/ min.	During induction P.R. per/min	Maintenance P.R. per/min.	P-value
M ± SD	83.64 ± 10.15	95.72 ± 8.17	89.6 ± 6.78	p>0.05

P- value (NS)
NS=non significant



Discussion

The table (1) and (2) show the PR changes during preoperative, induction(we measuring pulse rate one minute after intubation), and maintenance periods(we measuring pulse rate with in 15 to 20 minute), the importance of my study we can notice that there is relative cardiovascular stability with atracurium and the increase in pulse rate during rapid tracheal intubation with atracurium is not significant in comparison with other muscle relaxant.

Conclusion and Recommendation

From this study we can conclude that the use of atracurium in our routine work in our operating theater is very useful because it has no significant changes on pulse rate (it has no vagolytic activity) specially in patients suffering from ischemic heart disease and old age patients.

Our recommendation

We recommendate to use of atracurium in rapid tracheal intubation because it has no significant effect on the pulse rate and so it is useful in any patient specially in patient with ischemic heart disease to decrease the risk of ischemic changes and also in old age patients who can not tolerate the increase in the heart rate because the increase in heart rate associate with increase in myocardial oxygen demand.

References

1. **Drugs in Anesthetic and Intensive Care Practice by M.D. Vickers, M. Morgan, P. S. J. Spencer, and M.S. Read (Paperback - 11 Aug 1999.**
2. **Medicine for Anesthetists by Vickers, M. D. MB BS FRCA DA and Power, Ian MB ChB FRCA (Hardcover - 7 May 1999.**
3. **Mio, My Son by Astrid Lindgren, Ilon Wikland, and Jill M. Morgan (Hardcover - May 2003).**
4. ***G. Edward Morgan Jr, Maged S. Mikhail, Michael J. Murray.* McGraw-Hill Medical Publishing Division Inc., 2002.**
5. **Clinical AnesthesiologyG.Edward Morgan, Maged S. Mikhail, Michael J. Murray, United States, 26 August 2005.**
6. **Wylie and Churchill-Davidson's A Practice of Anesthesia Seventh Edition Nov 2003.**
7. **Lee's Synopsis of Anesthesia by G. B. Rushman, N. J. H. Davies, and J. N. Cashman (Paperback - Jul 31 1999).**
8. **"Definition of Muscle relaxant." MedicineNet.com. (c) 1996-2007. Retrieved on September 19, 2007.**
9. **"muscle relaxant." mediLexicon. (c) 2007. Retrieved on September 19, 2007.**
10. **"Muscle relaxants." WebMD. Last Updated: February 15, 2006. Retrieved on September 19, 2007.**
11. **"Skeletal Muscle Relaxant (Oral Route, Parenteral Route)." Mayo Clinic. Last Updated: April 1, 2007. Retrieved on September 19, 2007.**
12. **Miller, R.D. "Skeletal Muscle Relaxants," in, "Basic & Clinical Pharmacology: Seventh Edition," by Bertram G. Katzung. Published byAppleton & Lange, 1998, p.434-449. ISBN 0838505651.**
13. **Bowman, W.C. "Neuromuscular block." Br. J. Pharmacol. January 2006. Vol. 147, Suppl. S277-86. PMID: 16402115.**
14. **C.R. Craig , R. E. Stitzel (2003) Modern Pharmacology with clinical applications Lippincott Williams & Wilkins ISBN 0781737621 p339.**