Letter to the Editors

Prevalence of positive prick test to neuromuscular blocking drugs in the surgical population

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Recent years have seen a progressive increase in anaphylactic reactions to anaesthetic agents, the neuromuscular blocking drugs (NMBs) being responsible for between 70 and 80% of cases [1, 2]. Given the frequency of allergic reactions to NMBs, it has been proposed to carry out systematic preoperative screening for these drugs to detect sensitive subjects and prevent allergic reactions. However, current guidelines indicate that allergy tests on anaesthetizing are indicated only among those patients who have a history of an adverse reaction; this is the case, in fact, with other drugs [2]. Furthermore, no information is available regarding the prevalence of prick tests among the surgical population.

The aim of this study was to assess the prevalence of positive prick tests to NMBs used during anaesthesia in the surgical population and to analyse the contribution of risk factors in the presentation of positive prick tests to NMBs.

A prospective study was performed from September 2003 to July 2004 enrolling 424 patients (146 males and 278 females) who attended consultation for preanaesthesia in the Valladolid Río Hortega and Clinical Hospitals. The study was approved by the Hospital Research Committee and the patients gave their consent in writing. Every day, the first two patients over 18 years of age attending each of the two preanaesthesia consultations were asked if they would volunteer for a prick test for NMBs. All the patients were given the prick test for seven NMBs: suxamethonium, atracurium, vecuronium,

pancuronium, rocuronium, mivacurium and cisatracurium. The skin prick test was performed using the anaesthetic agents and other drugs directly from the ampoules and vials, with no dilution, on the volar surface of the forearm. For atracurium and mivacurium a 1 : 10 solution was used. Logistic regression analysis was carried out (SPSS 11.5; SPSS Inc., Chicago, IL, USA). The odds ratio (OR) was established at 95% confidence interval (CI). A *P*-value <0.05 was considered statistically significant.

Twelve of 424 (2.8%) patients had positive prick tests to one of the NMBs analysed. Of the seven substances analysed, the prick test was positive to only three and the largest number of positive cases was found in suxamethonium (*n* = 8, 1.9%), followed by atracurium (*n* = 2, 0.5%) and rocuronium (*n* = 2, 0.5%). Of patients analysed (*n* = 424), 49.5% reported a history of previous general anaesthesia, 21.7% a history of allergy to drugs, 20.2% a history of atopy and 16.5% a family history of allergy. Seventy patients had no risk factors. After the application of logistical regression for analysing risk factors, a history of allergy to drugs (OR 4.342; 95% CI 1.292, 14.590) was the only factor seen to have a predisposing influence on the presentation of a positive prick test to NMBs (Table 1). In the case of 12 patients with a positive prick test, the NMB to which they showed a positive prick test during anaesthesia was avoided.

Our study prospectively evaluated the prick tests in our patient population and noted positive prick tests in NMBs for 2.8%, particularly to suxamethonium. Of the various factors examined, only a prior history of allergy to medications was shown to predict positive prick tests to anaesthetic drugs. On the other hand, not all the patients with positive prick tests developed an allergic reaction to the drugs. This discrepancy between allergy test results and clinical outcomes is well known, ranging between 1/350 and 1/20 000 [2] depending on whether they are considered only slight (erythema) or serious reactions (anaphylaxis). It is important to note that the clinical significance of a positive prick test is uncertain,

Table 1

Results of logistic regression analyses: relationship between allergic predisposition factors and positive prick tests for neuromuscular blocking drugs

Predisposition factors	Positive prick tests		P-value
	OR	95% CI	
Age	1.015	0.978, 1.052	0.442
Sex	1.970	0.575, 6.749	0.281
Allergy history	4.342	1.292, 14.590	0.018
Anaesthesia history	1.834	0.479, 7.032	0.376
Family history	1.178	0.236, 5.874	0.842
Atopy history	0.000	0.000,	0.000

CI, Confidence interval; OR, odds ratio.

because the progression, or not, from a positive skin prick test to a clinical allergy is multifactorial (genetic factors, multiple exposures to the same drug, etc.). There is an absence of clear internationally accepted guidelines on skin prick testing, especially in relation to threshold test concentrations, which may explain the differences observed in the incidence of allergy to NMBs. It has recently been reported that nonmast cell-mediated positive intradermal skin reactions frequently occur with rocuronium and cisatracurium, even at a dilution 1 : 1000 [3]. This study shows that the prevalence of patients with positive prick tests to anaesthetics

occurred in 2.8% of this prospective cohort. Of the various factors examined, only a prior history of allergy to medications was shown to predict positive prick tests to anaesthetic drugs. These data support the proposal [2] that a prick test to NMBs is indicated only among those patients who have a history of an adverse reaction to them.

References

- 1 Mertes PM, Laxenaire MC; GERAP. Anaphylactic and anaphylactoid reactions occurring during anaesthesia in France. Seventh epidemiologic survey (January 2001–December 2002). *Ann Fr Anesth Reanim* 2004; 23: 1133–43.
- 2 Société Française d'Anesthésie et de Réanimation. Reducing the risk of anaphylaxis during anaesthesia. Abbreviated text. *Ann Fr Anesth Réanim* 2002; 21 (Suppl. 1): 7–23.
- 3 Berg CM, Heier T, Wilhelmsen V, Florvaag E. Rocuronium and cisatracurium-positive skin tests in non-allergic volunteers: determination of drug concentration thresholds using a dilution titration technique. *Acta Anaesthesiol Scand* 2003; 47: 576–82.

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