

Follow-up after anaesthetic anaphylaxis

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Background: The anaesthetic allergy clinic has been established at our institution for 30 years. Our practice has been to give patients a letter detailing the results of their investigations to pass on to subsequent anaesthetists. Our aims were to assess the adequacy of this letter in ensuring this vital communication, and to quantify the effectiveness of our recommendations on the safety of future anaesthesia.

Methods: A project was undertaken to contact 606 previous clinic patients living in New South Wales by using last known addresses on our database, public telephone listing and local doctors. The review also involved collecting information, where available, about subsequent anaesthesia and the adequacy of information transfer about medications given safely or otherwise at this time.

Results: Of 606 patients, 246 were contactable. Of these, 183 had been anaesthetised subsequently, all safely. It was

found that in only 11 cases had the patient's clinic letter been updated with the information from subsequent anaesthesia. We updated the letters of 82 patients with new information to improve the safety of drug selection for future anaesthesia.

Conclusions: Although clinic testing allowed a high degree of safety in subsequent anaesthesia, it is evident that there is a need for systems to be implemented to improve the flow of patient anaesthetic allergy information after subsequent anaesthesia.

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OVER a 34-year period, 1685 patients or histories were referred to the Anaesthetic Allergy Clinics run by the authors. A diagnosis of severe anaphylaxis was made in 814 patients and 23 died. The survivors and the patients in whom other diagnoses were made (Fig. 1) were given a letter stating what had happened, the tests performed and our conclusions. It was suggested they wear a warning chain or bracelet stating what they had reacted to, and when possible, safe alternatives. Each letter specifically requested the anaesthetist administering subsequent anaesthesia to notify us of the anaesthetic details so that the letter could be modified. In addition, patients were asked to request the details of the anaesthetic and to notify us of changes of address.

Over this period, we received regular requests for information from anaesthetists who were to anaesthetise patients who had lost letters. Although their clinic visit was documented in the hospital record, the majority of patients only visited our hospital once and their records were archived and not readily available for reference. Fortunately, we had kept our own copies of their results, which

enabled successful and timely transfer of this vital information.

This project was undertaken to ensure that the patients who had anaphylaxis had the optimum available information to facilitate safe subsequent anaesthesia, update their records when necessary and to reserve them in a database accessible to requests for information from anaesthetists. Other goals were to assess the adequacy or otherwise of our patient contact systems, and to assess the success of our information at preventing subsequent anaphylaxis in patients who have had confirmed anaphylaxis.

Methods

Ethics Committee approval was obtained although not required under National Health and Medical Research Council regulations.

Figure 1 shows the details of the patients investigated and how the patients to be contacted were selected.

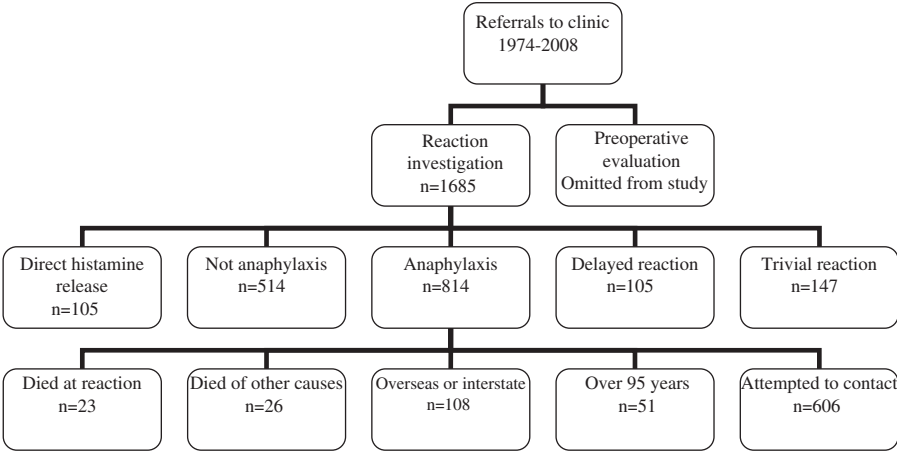


Fig. 1. Results of attempted follow-up of anaphylaxis patients.

In these patients, a diagnosis of severe anaphylaxis was made clinically and rated severe if the anaesthetist believed that the reaction was potentially fatal. The majority of patients who survived were tested by intradermal testing,¹ prick testing² or both. At various times over the years, radioimmunoassay (RIA) for drug-specific IgE³ or passive transfer testing (PK)⁴ was performed, and since 1992, mast cell tryptase testing⁵ (MCT) was included. If a reaction was attributed to a particular drug, it was on the basis of skin testing, RIA testing or it being the only drug administered.

We attempted to contact 606 survivors of severe anaphylaxis who had attended the anaesthetic allergy clinic, been diagnosed with severe anaphylaxis and who lived in New South Wales (Figs. 1 and 2). The details of the patients we did not attempt to contact are shown in Fig. 1.

Contact was made by verifying the last address in the database in the White Pages Telephone Website and ringing the person where the address was the same. If the address had changed, we endeavoured to contact the patient through their GP at the time of clinic attendance, or by searching the white pages website, and calling the patient and asking permission to contact them by mailing a questionnaire.

All patients contacted agreed to this and were sent a letter enquiring:

1. Whether they had undergone further anaesthesia?
2. If so, had they experienced further problems with allergy?
3. Were the details of the anaesthetic made available to them?
4. Would they give permission for their letter to go in a database so that future anaesthetists could gain access if they needed further anaesthesia?

5. Would they give permission for information regarding their reaction to be shared with other researchers in the field?

When patients were found to have had subsequent anaesthesia, we also obtained written permission to obtain details of the anaesthesia, and tried to obtain the records.

Results

The drugs the patients reacted to are shown in Table 1. Thirty-one patients had two reactions before referral, 23 to the same drug and eight to a drug from the same structural group. Four patients had second reactions after testing, one who had no culprit drug determined, two to neuromuscular blocking drugs (NMBDs) not tested and one who reacted to a skin test negative drug to which she was subsequently found to have a positive RIA test.

There was great difficulty in locating the patients (Fig. 2), and only 246 of 606 were able to be found. Thirteen patients had lost their letters. One hundred and eighty-three patients had subsequent anaesthesia, which was uneventful. Only 11 patients had received information regarding these anaesthetics. We obtained the records of 180. We updated the letters of 82 patients because new information was available that would improve the safety of drug selection for future anaesthesia.

The reviewed records often showed the ingenuity of anaesthetists in avoiding potentially hazardous drugs and often avoiding all the NMBDs, particularly by using regional anaesthesia and

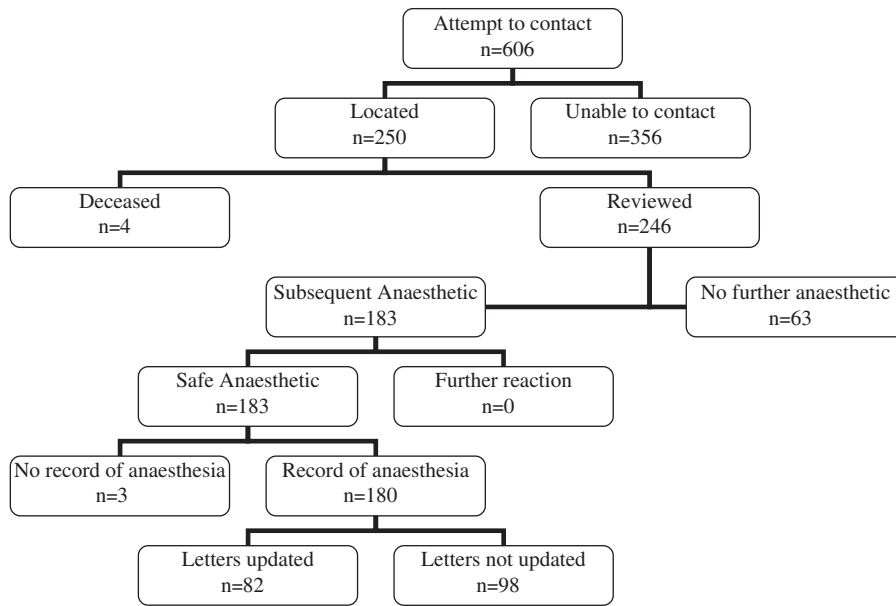


Fig. 2. Results of attempts to follow-up anaphylaxis patients.

laryngeal masks without NMBDs. Eight patients required retesting because of changes in drug availability and new information with respect to the safety of NMBDs was discovered in six and a new diagnosis (one latex and one chlorhexidine) was made in two. With greater recognition of chlorhexidine as a potential cause of anaphylaxis and easier availability of latex RIAs, we now routinely test for these as potential allergens.

Only two of the patients contacted did not wish to have their data available to future anaesthetists on request and neither of these wished their data to be available to other researchers.

Discussion

When anaphylaxis under anaesthesia occurs, the two patient-focused outcomes are effective treatment of the acute event and ensuring that subsequent anaesthesia is safe. The best insurance of safe subsequent anaesthesia is a documented safe anaesthetic.

There is now general agreement that the drug responsible for anaesthetic anaphylaxis cannot be determined reliably without investigation,⁶ special interest clinics should be established to investigate reactions^{6,7,8} and that skin tests and MCT are the best methods for diagnosis.⁶⁻¹⁰

There are few published results on subsequent anaesthesia after investigation at an anaesthetic clinic. Leynadier et al.¹¹ described 27 patients with positive prick tests for an NMBD after ana-

phylaxis. Thirteen had 19 uneventful anaesthetics using skin test-negative NMBDs. Thacker and Davis¹² had three patients of 50 who had second reactions to an NMBD that was either not tested or had an equivocal positive test. Eighty-three anaesthetics were given and NMBDs were used in 49 patients. Seven patients with negative skin tests had uneventful subsequent anaesthesia. Moscicki et al.¹³ found that 16 of 27 patients had positive skin tests and 11 negative. Eleven had subsequent uneventful anaesthesia. McNeill et al.¹⁴ described uneventful subsequent anaesthesia in 20 of 50 investigated patients, and Soetens et al.¹⁵ found positive skin tests to NMBDs in 43 patients who received skin test-negative NMBDs uneventfully on 26 occasions.

In our own previous published studies, 51 of 52 patients who had anaphylactic reactions in which no cause was found had subsequent uneventful anaesthesia. Of 301 patients with a cause found for their anaphylaxis, 295 had uneventful anaesthesia, while six had a second reaction.¹⁶ The safety of subsequent anaesthesia in the patients investigated and in whom no drug responsible is detected illustrates the importance of providing information by a letter.

The study showed that the compliance with the requests to notify us of changes of address and information regarding subsequent anaesthesia was disappointingly low; obviously, our system was flawed. The poor upgrading of the patient information was compounded by an apparent failure of anaesthetists to recognise the value of providing

Table 1

Cause of Anaphylactic reaction in 606 Patients.	
<i>Induction Agents</i>	
Thiopentone	33
Alfathesin	19
Propofol	4
Propanidid	6
Methohexitone	1
	63
<i>Neuromuscular blockers</i>	
Suxamethonium	123
Alcuronium	93
Rocuronium	63
Atracurium	34
Vecuronium	21
d-tubocurarine	11
Gallamine	8
Pancuronium	7
Suxamethonium/alcuronium*	3
Cisatracurium	2
Mivacurium	2
Alcuronium/d-tubocurarine*	2
Suxamethonium/vecuronium*	2
Decamethonium/suxamethonium*	1
Suxamethonium/atracurium*	1
Suxamethonium/d-tubocurarine*	1
Suxamethonium/gallamine*	1
	375
<i>Induction agent and NMBD</i>	
Thiopentone/suxamethonium*	2
Thiopentone/alcuronium*	1
Thiopentone/atracurium*	1
	4
<i>Antibiotics</i>	
Cephalosporins	38
Penicillins	8
Vancomycin	3
Gentamicin	1
Clindamycin	1
Tazocin	1
	52
<i>Colloid solutions</i>	
Gelatins	24
Dextran 70	4
	28
<i>Narcotics</i>	
Morphine	8
Fentanyl	4
Pethidine	3
Omnopon	1
	15
Latex	5
Protamine	4
Local anaesthetics	3
<i>Other drugs</i>	
Chlorhexidine	2
Patent Blue	2
Contrast media	2
Ondansetron	2
Fragmin	1
Metoclopramide	1
Depo-medrol	1
Neostigmine	1
	12
<i>No causal drug detected</i>	45

*Intradermal positive to two drugs administered before reaction.

anaesthetic details showing what was safe in a clinical situation as opposed to an investigating clinic. Subsequent anaesthesia after investigating by skin testing, MCT and RIA tests (where available) is usually followed by uneventful anaesthesia. However, the best and safest information is logically a documented uneventful anaesthetic subsequent to the reaction. Allergy to NMBDs persists up to at least 30 years¹⁷ and patients remain at risk.

The issue of how best to ensure that documentation of subsequent anaesthesia reaches future anaesthetists is an important one, as this review demonstrates that our previous system has not been working well. In an early study, we identified communication problems as a major factor in a fatal second anaphylactic reaction and a serious second occurrence of Stevens Johnson Syndrome.¹⁸

Hopefully, Patient Record Books and electronic medical records may make access to safety data more accessible.

Identifying bracelets or medallions are of proven benefit, especially when unconscious patients require anaesthesia (although we are not aware of this having occurred in our patients). In the usual anaesthetic situation, however, a letter carries enormous advantages. Less than 50% of patients who have been seen at recall are wearing their devices. There is insufficient room on a warning bracelet to adequately give the anaesthetist the best information possible, particularly in the case of NMBDs, where cross sensitivity is common, and patients with severe reactions where no responsible drug can be identified. The letter adds information to the bracelet, including information that an NMBD used without adverse event is safe, or if this information is not available, that a skin test-negative drug is possibly safe. Further, in 50% of patients who give a history of allergy to anaesthetists, the history is spurious¹⁹ and a documentary evidence is very helpful and reassuring.

In recent times, we have introduced other strategies to improve the flow of valuable information. The most important of these was encouraging the patient to take on a key role as custodian of their precious information. When the patient is aware of how important it is that the most up-to-date information is written on their clinic letter, and that a copy of it is faxed to our clinic as a backup, then they will personally request this from their anaesthetist. We have also specifically mentioned the fax number in the patient's letter for the anaesthetist to update our clinic with subsequent anaesthetic details. Early indications are that this approach is

ensuring a better flow of information on the safety of anaesthesia in patients with previous anaphylaxis under anaesthesia.

We have also converted the letters written describing each patient's reaction, the results of testing and the details of subsequent anaesthesia to PDF files and stored the records on a CD that can be accessed via the hospital Intensive Care Unit. These data have been accessed on 11 occasions over the past 12 months. It is possible that such information could be available in moments at all hours of the day and night if a web-based password protected database was created; however, privacy considerations at present prevent such an approach. We intend to make the details of access more widely available through national societies.

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