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Reply:

I thank Drs. Dewachter and Mouton-Faivre for their thoughtful comments on our case report. I believe, however, that certain points require comment and clarification.

First, they state that a reaction to rocuronium cannot be ruled out because of the brief time between the event and the subsequent skin testing. We agree that published recommendations¹ suggest a delay of four to six weeks from the event to allow regeneration of reactive IgE and mast cells. Due to logistical issues, this was not feasible in our situation. The patient did, however, react to succinylcholine, which, if their reasoning is true, would require antibodies to two separate neuromuscular blocking drugs (NMBDs) instead of one. This is certainly possible, and we subsequently referred the patient for repeat skin testing. Fentanyl allergy, however, is exceedingly rare, with only case reports documenting occurrences. Our hypothesis of causation by fentanyl rests partially on the fact that a false positive skin test to fentanyl should be considerably less likely than a NMBD. The work by Dhonneur et al.² highlights the hazards of interpreting a positive skin test for rocuronium or vecuronium.

The results of the patient's repeat skin testing were quite unexpected: her only reaction was to the positive control (histamine), with no reaction to any of the NMBDs or fentanyl. The patient's allergist believes that these results represent a false negative, and that she has a low level of antibodies to one of the drugs tested. This situation has been encountered previously with Hymenoptera venom allergy and is a vexing problem in the allergy literature.³ The best advice we can offer the patient at this point is to avoid fentanyl, succinylcholine, and rocuronium. If she were to require surgery with paralysis in the future, cisatracurium may be the wisest choice. One cannot, however, be entirely certain, as false-negative results have also been reported for NMBDs.⁴

Finally, I would like to comment on the assertion that we distorted the conclusions of the allergist. Due to the ambiguity of the original test results, the allergist drew a rational conclusion: avoid all paralytic agents. We

have made the patient aware of the uncertainty from the skin tests. Our position, however, is that this could pose an unnecessary hazard to the patient in case of future surgery. General anesthesia with airway management, particularly in an emergency, could be much more hazardous without the use of a NMBD. The patient's lack of response (twice) to cisatracurium is somewhat reassuring, as she did not receive this drug prior to her initial reaction. I apologize for the lack of clarity on this point in the case report. A wiser phrasing might have been: "It is likely that the patient may receive selected NMBDs, such as cisatracurium, in the future if circumstances warranted."

Kenneth C. Cummings III MD
The Cleveland Clinic, Cleveland, USA
E-mail: cummink2@ccf.org

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Evaluating effectiveness of medical emergency teams

To the Editor:

Brindley et al.¹ are to be congratulated on their balanced appraisal of the MERIT study report.² Unlike other commentators^{3,4} who have used its results to question the value of Medical Emergency Teams (MET), they rightly draw attention to the limitations of the study, which make it difficult to draw firm conclusions from its results. MERIT failed to find a clear advantage to the introduction of MET in a cluster randomized prospective trial, but the duration of the study period was short (only six months), and there was possibly cross-contamination between the study groups. Such teams are complex, introduction is labour-intensive and may be difficult, and after only

six months implementation in the MET hospitals was only partial.

Brindley *et al.* may not have put this trial into full perspective for your readers. At The Ottawa Hospital, after two years of MET, we now receive > 40 calls per 1,000 hospital admissions (compared to 8.7 calls per 1,000 admissions in MERIT), and > 70% of the intensive care unit (ICU) admissions from our inpatient nursing units are preceded by a call to MET (only 30% in the MERIT trial), both suggesting much more effective implementation than in the MERIT study. Coincident with MET introduction, we have observed a 60% reduction in unexpected cardiac arrests compared to pre-MET historical control years, 10% fewer postoperative major complications, and trends towards fewer readmissions to the ICU, fewer postoperative deaths, and a reduced hospital standardized mortality ratio.

The MERIT study was an enormous undertaking, but to evaluate an intervention it is necessary to adequately implement it. Unfortunately MERIT failed to completely do so, despite the investigators' considerable efforts.

Alan Baxter MD FRCPC

The Ottawa Hospital, Ottawa, Canada

E-mail: abaxter@ottawahospital.on.ca

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Reply:

I thank Dr. Baxter for his comments and commend him on outlining much-needed provisional Canadian data. Presently, albeit imperfect, MERIT is still the largest and best-designed published trial: 23 centres, > 100,000 patients, prospective and controlled.¹ Therefore, it currently deserves to dominate debate. Notably, both medical emergency team (MET)-hospitals and control-hospitals

had decreased rates of cardiac arrest. This does not mean MET did not affect patient-outcome, rather there may be many ways to achieve these goals. It also cautions against "before-and-after" methodology. Furthermore, MET-detractors are not arguing against rapid-response, just whether MET is the best way to provide it. Respected authors have highlighted that MET criteria might be improved upon; that MET implementation might distract from other issues; and that critical care medicine is increasingly responsible for even routine acute care.²⁻⁴ Medical emergency team was a commendable first-step, but we need to acknowledge that it is also filling a void caused by over-worked and under-resourced nurses; an insufficient number of monitored beds; inadequate communication, and decreased "patient-ownership". To not concomitantly address these problems is inconsistent with optimal patient care. Medical emergency team is fast becoming an unproven expectation. Medical emergency team implementation may also irrevocably change physician-training, physician-accountability, even the nature of critical care medicine. Furthermore, how we respond to difficult debates says a lot about our specialty. This includes how we treat research findings that challenge what is entrenched, popular, or expedient. Unfortunately, presently, much of the evidence supporting MET implementation is circumstantial. Equally, both proponents and opponents rely upon preconceived beliefs as much as science. Open minds, free debate, and objective data offer the best way forward.

Peter G. Brindley MD FRCPC

University of Alberta, Edmonton, Canada

E-mail: peterbrindley@cha.ab.ca

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