

中文題目：血液透析過程中的過敏性休克—被輕忽的疾病

英文題目：Anaphylactic intradialytic hypotension: An overlooked disorder

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Introduction

Intradialytic hypotension is a major adverse effect occurs during hemodialysis. It's crucial not only to evaluate dry weight but also quickly identify other fetal conditions such as sepsis, blood loss, new onset of cardiac arrhythmias and allergy. Hypersensitive reactions which occur during hemodialysis have been known since 1975¹. We here report a patient who experienced anaphylactic shock during hemodialysis resulted from allergy to synthesis membrane dialyzer. Our main purpose is to raise the attention to allergic reactions during hemodialysis, which is an underdiagnosed problem.

Case Presentation

A 61-year-old man with end-stage-renal disease presented at our emergency room on May 25th, 2018 due to intra-hemodialytic anaphylactic shock for about one month. He had received hemodialysis with synthetic membrane dialyzer (FX-100 made of polysulfone, sterilize steam not ethylene oxide) through an arteriovenous fistula in Peng-Hu Hospital since 2011. However, intra-dialysis hypotension with shock status (56/27 mmHg) developed and persisted for one month. There were no hypotension episodes during non-hemodialysis period.

On arriving at our ER, his initial vital signs were a temperature of 36.5°C, blood pressure of 171 /79 mmHg, pulse rate of 95 bpm and respiratory rate of 17 breaths/min. He denied shortness of breath, respiratory symptoms, chest or abdominal pain, urinary frequency or dysuria. The physical examinations of respiratory, cardiovascular, abdominal and urologic systems were unremarkable.

Basic laboratory examination reported white cell count (WBC) 5860/cumm with eosinophilia of 44.7%, normal level of C-reactive protein, procalcitonin, and IgE. His medical record revealed the eosinophil count was 6% on April 18th and 13% on May 16th. 12 lead EKG showed normal sinus rhythm. His ejection fraction was 61%.

Persistently elevating eosinophil level gave a quick hint to allergic reaction. However the patient denied the exposure of new food or medicine. Under the suspicion of allergy to dialyzer, we replaced the synthetic membrane dialyzer with cellulose membrane dialyzer (artificial kidney as CTA-2000, made of cellulose tri-acetate, and sterilized with gamma ray). There were no episodes of intra-hemodialytic hypotension. The eosinophil level gradually declined to 13.6% at the time of discharge, and normalized to 4.5% on Sep 10th, 2018.

Discussion

The manifestations of intrahemodialysis hypersensitive reactions vary from annoying (such as contact dermatitis or urticaria) to more serious (hypotension, angioedema) to devastating (such as anaphylactic shock or bronchospasm). Based on current evidence², the exposure to sterilizers, dialyzers, solutions and medications used during dialysis procedures are all possible causes. Eosinophilia, elevated IgE levels and mast cell tryptase indicate the diagnosis of allergic reaction.

Hypersensitive reactions triggered by dialyzer membranes could be immediate to delayed after administration. They could be categorized into two types: type A and type B. Type A reactions occur within 30 minutes after the onset of dialysis, usually in the first few minutes. The mechanism of type A reactions is associated with preformed antibodies such as immunoglobulin E (IgE). The symptoms of type A reactions are usually much more severe than the ones of type B and often required immediate cessation of dialysis. Type B reactions are often delayed reactions. They are thought to be mediated by the complement system.

Certain types of dialyzers have been reported to be associated with allergic reactions without specified IgE antibodies. Both cellulose and synthetic membranes had been reported to cause those reactions³.

Our patient fit a type B reaction except the severity. He had persistent eosinophilia before changing the dialyzer membrane. The hypersensitive reaction was delayed. His IgE was within normal limits. We suspected that it might be due to type B reaction and because of the immune dysregulation in patients with end stage renal diseases, testing results of IgE level might be uncertain.

Conclusion

In our case report, the patient's blood pressure during hemodialysis maintained normal once we switched the synthetic membrane to the cellulose membrane. Hypotension in a setting of hemodialysis could be due to wrong estimate of dry weight, severe infection, cardiovascular problems, blood loss, and allergy, etc. Among those who experienced intrahemolytic hypotension accompanied with eosinophilia, hypersensitive reactions should always be taken into first consideration. Also, more efforts and attention should be paid to anaphylactic intradialytic hypotension caused by newer synthetic membranes, which is an often overlooked disorder.

References

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