

## CASE REPORT

## The Feasibility of Evidence-based Decision Making in a Toxicology Emergency Case

## ABSTRACT

Evidence-Based Medicine (EBM) aims to bring the best available evidence into clinical practice. Different clinical methods of education such as in-patient rounds, follow up rounds, out-patients rounds, group sessions, grand rounds, lectures, and journal clubs could be held by EBM approach. The current text presents two interrelated case reports; a case report of EBM decision making in an emergency condition which incorporates a case report of surviving an Aluminum Phosphide poisoned patient by placing Intra Aortic Balloon Pump.

**Key Words:** Evidence-Based Medicine, Case Report, Aluminum Phosphide, Poisoning, Educational Round, Emergency

## BACKGROUND

Evidence-based medicine (EBM) is a growing approach to provide clear, diligent, and reasonable use of current best pieces of evidence in making decisions in health care (1,2). There have been some trends to incorporate the EBM into the medical students' curriculums but it has not been highly successful (3-7). Also the application of EBM in decision making for patients in emergency conditions is not common in our region. In this paper we report a sample of evidence-based educational round that was performed in Poisoning Ward of Medical Toxicology Centre in which a clinical decision was made in an EBM approach based on a case report.

## CASE PRESENTATION

A 26-year old woman referred to Poisoning Emergency Ward of Imam Reza Hospital, Mashhad, Iran following Aluminum Phosphide (ALP) poisoning. She was agitated but conscious. Her complaints were: feeling thirsty and deep regret for her suicide. At the time of admission, her blood pressure was 90/60 mmHg and her pulse rate was 100/min. She had no fever. Despite the administration of sodium bicarbonate and volume expander fluids, her blood gases showed progressive metabolic acidosis and her blood pressure was dropping. In echocardiography the left ventricle ejection fraction was less than 20%, which is an anticipated manifestation with a high mortality.

In order to make a decision based on the evidence, an educational round was performed by a team consisting of a faculty member, two assistants of medical toxicology fellowship, an internal medicine assistant, two Emergency medicine assistants and two interns of the poisoning ward. 5 steps of EBM were employed as it is described below to find a treatment option in the emergency situation which led to satisfying clinical results.

## STEP I: ASKING AN ANSWERABLE QUESTION:

First, students raised their questions about the patient

without any order. All questions were recorded then organized in the following framework of PICO. P (Problem): The clinical manifestations and findings of ALP in our patient and the important characteristics of that specific patient were completely described. I (Intervention): Identifying the intervention was the next step of the PICO process. In this step, we had to identify our plan including diagnostic tests and treatment for the patient since her medical condition was deteriorating despite employing all of the suggested therapies. Her blood pressure was dropping despite administering Normal Saline 0.9% infusion serum and metabolic acidosis became worse despite the infusion of sodium bicarbonate as recommended doses for acute lactic acidosis. To perform an appropriate I of PICO according to EBM approach, we searched for relevant studies through online databases available via Central Library resources to find new treatment methods. Both toxicology fellowships were assigned to do the search in the Poisoning Ward and present the results for others. Their search was refined to our patient's situation. A new idea emerged from searching: intra-aortic balloon pump (IABP) has been used effectively in such patients and was reported as a case report article (8). Although there was no randomized clinical trial about IABP, it seemed to be an effective attempt according to the evidence.

C (Comparison): The third phase of a well-designed question is comparison which focuses on the main alternative treatment. The Comparison is the only optional part of the PICO question and in some cases like our case, there may be no alternative. In our experience up to that patient, all patients with the same medical conditions succumbed to death between 3 to 48 hours of admission. Comparing the standard care- which led to death in all similar patients- with IABP persuaded the team that placing IABP could be curative and the best clinical decision for that case based on the available evidence (8).

O (Outcome): There were not any randomized clinical trials about placing IABP for patients with ALP poisoning but in several case reports patients with refractory hypotension survived after that intervention.

## Step II: SEARCHING FOR THE BEST EVIDENCE

Based on the available evidence in Goldfrank's Toxicologic Emergencies (text book of Clinical Toxicology), up-to-date, clinical evidence, MD consult, and Cochrane library, ALP poisoning has a very poor outcome and its mortality is high but variable based on the amount of ingested poison, presence of vomiting, age of the patient, presence of prior metabolic disorder, other co-morbid diseases and performing gastric lavage very soon after poisoning and probably an early management(9,10). No definitive treatment for ALP poisoning was accessible. It seemed that finding a

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method for overcoming hypotension and metabolic acidosis would stabilize the patient. For that, we researched Up-to-date, clinical evidence, MD consult, Cochrane library and Google Scholar using these key words: Aluminum Phosphide, Poisoning, Treatment. The only available and relevant piece of evidence were case reports of IABP placement in hypotensive patients.

#### STEP III: CRITICAL APPRAISAL

Although the best study type for decision making would be meta analysis, systematic reviews and at least a randomized control trial, such studies were not found. Therefore, we reviewed all reports of new related treatments. Based on several case reports about the placement of IABP, it was proposed that this intervention could be helpful to save our patient's life.

#### STEP IV: APPLYING THE EVIDENCE TO A PARTICULAR PATIENT

The feasibility of performing the IABP procedure for that specific patient was discussed and confirmed through consultation with vascular surgeons of Imam Reza Hospital. IABP was placed in patient's aorta 12 hours after the admission to the Poisoning Ward. Before the procedure, blood pressure of the patient was dropping despite the infusion of Normal saline 0.9% and infusion of vasopressor agents. After the placement of IABP, vasopressor infusion requirement decreased gradually and during the administration of sodium bicarbonate severity of metabolic acidosis attenuated and the need to the infusion of sodium bicarbonate decreased gradually. General health condition of the patient became more satisfactory and finally after about two weeks, she was discharged healthy from the Poisoning Ward.

#### INVESTIGATIONS

Evidence -based educational rounds in emergency departments are not always feasible regarding the emergent condition, little time, limited access to search utilities in the emergency department ,and etc(11) . Despite the growing emphasis of evidence-based medicine

(EBM) in the medical school curriculum, and the recognition of EBM's role in the practice of emergency medicine (EM), there are no current guidelines on how to teach EBM to medical students during their Emergency Medicine rotations. However, if possible they might benefit greatly (12,13).

#### OUTCOME AND FOLLOW-UP

Employing EBM approach led to identifying a treatment options for a poisoned shocked patient (IABP) and saved her.

#### DISCUSSION

In EBM practice, we use standard protocols for searching, determining the validity of the data, and affecting the size of the existing evidence (1-4). The main difference between EBM practice and traditional methods is reproducibility in the results of EBM practice because it is based on using these standard methods (1).

Clinical guidelines are systematically prepared statements to assist medical management decisions. As clinical case reports usually don't provide representative data for generalization in clinical management methods, clinical methodologists consider them in the lowest rank of the quality (2). However, when the best available evidence is a case report, it could reasonably lead to acceptable clinical decisions. (2, 14).

Moreover, the feasibility of Evidence- based decision making in emergency departments has been doubtful because of several limitations in EDs like time, access to search tools, etc. This report magnifies the feasibility and role of evidence- based decision making in achieving the best clinical outcomes.

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