

# A case of elevated procalcitonin (PCT) level in anaphylactic shock

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## Abstract

**Introduction:** Anaphylaxis is a life-threatening condition, which is diagnosed clinically and confirmed by raised serial serum tryptase levels.

**Case Presentation:** A 75-year-old female, was prescribed meropenem, resulting in anaphylactic shock. She was mechanically ventilated and received intramuscular adrenalin in addition to intravenous hydrocortisone and chlorpheniramine, and nebulized salbutamol. Within two days, the anaphylactic shock had resolved, she was weaned off mechanical ventilation, and discharged to the ward. Procalcitonin (PCT) and serum tryptase levels sent within the first hour of the anaphylaxis. However, the initial and serial serum tryptase levels came significantly high, confirming the diagnosis of anaphylaxis, initial PCT level came significantly high as well. Daily follow up of the PCT levels went back to normal.

**Conclusion:** PCT can be an alternative diagnostic biomarker of anaphylaxis

## Introduction

Procalcitonin (PCT) is a specific diagnostic and prognostic marker for systemic bacterial infections [1]. Moreover, PCT is used as a guide to initiate and discontinue antibiotic therapy in septic and chronic obstructive pulmonary disease patients [2,3].

Anaphylactic reactions are the most severe and potentially life-threatening conditions seen in allergy [4]. The diagnosis is by clinical criteria and confirmed by laboratory tests, such as serum total tryptase, and plasma histamine levels [5].

High PCT levels were reported in anaphylaxis [6,7]. In this case report, PCT was significantly elevated in the case of anaphylactic shock.

## Case presentation

A 75-year-old female, who was under treatment in the medical ward of pneumonia and urinary tract infection. She had a past medical history of being bed ridden after intracerebral hemorrhage, that was surgically drained three years earlier followed by tracheostomy and gastrostomy. The patient had known allergy to quinolones. During her stay in the ward, she has been prescribed meropenem. Unfortunately, she developed anaphylactic shock that presented with profound hypotension, angioedema, severe bronchospasm, and generalized skin rash. In addition to the assisted mechanical ventilation via the

tracheostomy tube, the patient immediately received intramuscular adrenalin 0.5 mg, that was repeated three times, together with intravenous 1 litre of lactated ringers bolus, hydrocortisone 200 mg, and chlorphenamine 10 mg in addition to inhaled salbutamol nebulizer. Afterward, the patient transferred to the intensive care unit (ICU), where she was hooked on mechanical ventilation and closely monitored. Two days later, the patient was weaned off mechanical ventilation and discharged to the medical ward. Serial serum tryptase levels sent within the first hour, after two hours, and 24 hours later, their results came 106 ugs/l, 53 ug/l, and 10.2 ugs/l respectively. On the same day before this event, the PCT level was 0.3 ng/mL, but the PCT level in the blood sample collected in the first hour after the anaphylaxis came 35 ng/mL. Daily PCT level showed significant reduction back to the baseline (Table 1).

## Discussion

PCT is the prohormone of calcitonin, that is synthesized by thyroid cells. During sepsis, many tissues and immune cells secrete PCT, especially, neuroendocrine cells of the lungs and the intestine [8]. PCT was reported to elevate in trauma, burns, extensive surgery, cardiac surgery, severe pancreatitis, and autoimmune diseases flares [9].

Anaphylaxis is primarily diagnosed by the clinical criteria, which is valid even if the serum tryptase levels are normal. Confirmatory tests as plasma histamine level or serum total tryptase level are not specific, require special handling of the samples and are of a high cost [5].

Table 1. Laboratory results

	Before anaphylaxis	1 <sup>st</sup> hour after anaphylaxis	2 hours after anaphylaxis	Day 2	Day 3	Day 4	Unit
PCT	0.3	35		1.3	0.8	0.32	ng/mL
Serum tryptase		106	53	10.2			ugs/l
WBC	12	11.9		10.98	10.2	10.27	$\times 10^9/L$
CRP	47	55		49	43	38	mg/L

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Few cases reported the rise in PCT level during anaphylaxis [6,7]. A cytokine storm occurs in anaphylaxis releasing proinflammatory cytokines, such as interleukin-6 and interleukin-1, and tumor necrosis factor- $\alpha$ . Accordingly, it might mediate PCT elevation [1,10].

In this case, the diagnosis of anaphylaxis was confirmed by both the typical clinical presentation and response to treatment, and the elevated serum tryptase levels. The significantly elevated PCT level could not be misdiagnosed as sepsis induced as it was low few hours before the event of the anaphylaxis. Additionally, PCT rapidly dropped back to normal on the following days (Table 1).

## Conclusion

The conduction of further studies on the use of PCT as a cost-effective, less complex, and reliable alternative biomarker to aid in diagnosing anaphylaxis is highly proposed.

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