Research Article

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Procalcitonin Interest to Assess a Septic State Inducing the Death

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Abstract

For 90 cases, two groups were stratified by their final diagnosis: 33 of natural deaths and 57of violent deaths. There were no significant elevation of procalcitonin (PCT) in the group of violent deaths. We noted 6 elevations of PCT for deaths of natural origin (15.4%) and in 3 cases there was an evidence for an infectious context (recent anti-infectious treatments, chemotherapy in progress). Control of CRP performed on blood samples found initial elevations above 100 mg / L in 3 of the 6 cases (including 2 of 3 cases associated with an infectious context). There is no evidence of increased frequency of positive PCT for intermediate TPM (time post mortem), long TPM and undefined TPM. The PCT appears to remain stable over time and whatever the conservation conditions of the body. However given the size of some subgroups, it appears necessary to extend this study. The latter study found a PPV (positive predictive value) and clinical specificity of 100% for a cutoff set at 10 ng / L. By taking this threshold, we find no significant increase in cases of violent deaths.

Keywords: Procalcitonin, Sepsis, Biomarker

Objective

ideally, the completion of an autopsy is essential establishing the causes of death. The evaluation of stable biological markers might assist in this process. In this context, procalcitonin (PCT) is a recognized marker of sepsis in clinical practice and has also been validated in post-mortem analysis. Although, the postmortem PCT serum level remains similar to ante-mortem in the first 140 hours, body conservation condition could influence the behavior of this prohormone. In this study, we evaluated the use of PCT when collecting the body carried out.

Methods

we conducted a retrospective study made in the Val d'Oise (France) by the forensic unit of the Gonesse hospital between January 2006 to January 2009. The sampling of whole blood in NaF as anticoagulant for the PCT assay was done from the collecting body when carried out. We have identified 96 cases and the state of conservation of their blood samples, allowed the measurement of PCT (samples were conserved at -80°C). PCT was assayed using an immunochromatography method (BRAHMS, GERMANY). We chose a cut-off of 10 ng /L as significant of septic state. The results were analyzed based on the post mortem interval (PMI) and the final diagnosis established.

Results

As a function of post-mortem interval:

When PMI was short (1 to 12 hours; 8 cases), all PCT assays were negative (< to the cut-off). PMI was intermediate (12 to 24 hours) for 58 cases: 5 cases were found positive for the PCT (8.6%) and accordingly to deaths from natural sources. In the group of long PMI (death after 24 hours), 5 cases showed negative PCT assays. The table 1 summarizes all the results.

Table 1: PCT test PCT based on period post-mortem (PPI)

	Negative PCT	Positive PCT
Short PMI (liv-, Sti-)	8	0
Intermediate PMI (liv+, Sti+, Rot-)	53	5
Long PMI (Rot+)	5	0
Funeral Examinations	24	1

Liv: lividity - *Rig:* Stiffness

In the long PMI group, the bodies were examined at the funeral. There is a positive assay (for a natural death) among the 25 cases (4%). There is no significant difference between the both ratios: groups short PMI / intermediate PMI and intermediate PMI / long PMI. For 90 cases, two groups were stratified by their final diagnosis: 33 of natural deaths and 57of violent deaths.

There was no significant elevation of PCT in the group of violent deaths for all PMI groups. We noted 6 elevations of PCT for deaths of natural origin (15.4%) and in 3 cases there was an evidence for an infectious context (recent anti-infectious treatments, chemotherapy in progress). Control of C-reactive protein performed on blood samples found initial elevations above 100 mg / L in 3 of the 6 cases (including 2 of 3 cases associated with an infectious context).

In a case of natural death with negative PCT negative test with a short PMI and neuroleptic treatment, we found the temperature body was abnormally elevated in regard to the PMI: these findings permitted to determine a possible neuroleptic malignant.

Diagnostic

In the context of death

For 90 data usable, two groups were defined from the cause of death established at the end of the lifting body with 33 natural death sand 57 violent deaths. There was no significant elevation of PCT in the group of violent deaths. We note 6 elevations in PCT for deaths from natural origin (15.4%). In three of these cases, it was found during the removal of body parts other evoking an infectious context (recent prescriptions and/or chemotherapy course).

Discussion

The study Tsokos et al. showed that the rate of post-mortem PCT were similar to ante-mortem rate in the first 140 hours. In this study, it is not highlighted increasing frequency of PCT positivity for long PPI, intermediate or if stored at the funeral home [1]. PCT seems to remain stable over time and whatever the storage conditions of the body. However, given the size of some subgroups, it appears necessary to extend this analysis. Ideally, the evaluation of any biomarker requires knowledge of the exact cause of death related to the completion of an autopsy.

It under the Prosecutor's decision, there are a number of deaths not suspicious when the etiology of death can not be known precisely at the end of the first findings of investigations. In 2007, INSERM is in France 34 703 deaths of unknown cause or ill-defined (6.7% of all deaths) [2]. Using post-mortem of the PCT has been validated against a diagnosis ante-mortem known or in the autopsy or forensic scientists [1, 3]. This latter study found a positive predictive value (PPV) and a specificity of 100% for a threshold value of 10 ng / L for PCT. By taking this limit, we do not find any significant increase in cases of violent death [4].

Conclusion

Use of the PCT as a biological marker for septic state is suitable in forensic medecine to explain the cause of death. As part of the collection of the body, the existence of arguments in favor of a septic etiology in the initial findings may be supported by a significant rise in PCT.

References

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