SOHO ANNUAL MEETING 2024

PROGNOSTIC ROLE OF SERUM PROCALCITONIN LEVELS IN HOSPITALIZED PATIENTS WITH MALIGNANT PLEURAL EFFUSION

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INTRODUCTION

- Procalcitonin (PCT) is the peptide precursor of calcitonin, primarily produced by the thyroid parafollicular cells and neuroendocrine cells in the lungs and intestine[1].
- In healthy individuals, the level of PCT is low in the serum (≤0.1 ng/mL)[1,2]
- PCT has been recognized as a biomarker to diagnose bacterial infections[3].
- It may also be elevated in non-infectious causes like trauma, shock, liver and kidney diseases, and certain malignancies such as medullary thyroid and small lung carcinoma[3,4].
- However, the role of PCT in malignancy-related pleural effusion (PE) remains **uncertain**.

AIM

To investigate the prognostic value of serum procalcitonin levels in hospitalized patients with malignant pleural effusion.

METHOD

- This descriptive, retrospective study included patients (≥18 years old) admitted at the Montefiore New Rochelle Hospital between 2018 and 2023.
- Patients underwent thoracocentesis and had confirmed malignant pleural effusion.
- Blood was drawn and procalcitonin levels were measured within the first ten days of hospitalization.
- Serum procalcitonin data were expressed as median and interquartile ranges (IQR).

RESULTS

- Among 121 patients who underwent thoracocentesis with measured PCT levels, 13 (10.7%) had malignant pleural fluid cytology.
- Of these, five had been previously diagnosed with malignancy; 3/5 had documented metastasis.
- PCT was measured on hospital day one or two in 12/13 and day ten in 1 patient.
- No patient had bacterial pneumonia or bacteremia. Two were COVID-19 positive.
- Median PCT in all patients was 0.3 (IQR: 0.08, 0.53; normal range <0.25 ng/ml). PCT was normal in 6/13 patients (46.1%) and elevated in 7/13 (53.8%).
- 9 patients (69.2%) died within 6 months of hospitalization.
- Patients with higher PCT had higher mortality [0.41 (IQR: 0.13, 0.82) vs. 0.19 (IQR: 0.05, 0.30)].

Fig 1. Selection of study population

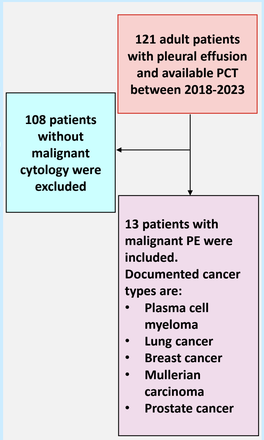


Fig 2. Grouped median with individual PCT levels in patients with malignant PE

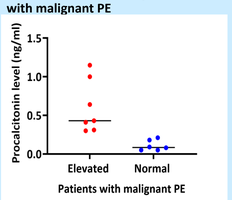


Fig 3. Imminent death observed among patients with malignant PE and elevated PCT

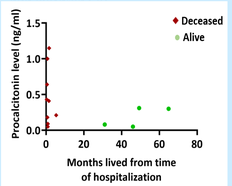


Fig 4. Demographics of the study population including pleural fluid cytology, and culture reports

PATIENT	AGE (IN YEARS)	GENDER	PLEURAL FLUID CYTOLOGY	PLEURAL FLUID CULTURE
#1	73	Female	Plasma cell myeloma	No growth
#2	78	Male	Prostatic adenocarcinoma	No growth
#3	74	Female	Mullerian metastatic carcinoma	No growth
#4	63	Female	Breast carcinoma	No growth
#5	69	Female	Metastatic breast carcinoma	No growth
#6	67	Female	Metastatic pulmonary adenocarcinoma	No growth
#7	84	Female	Mixed population of polymorphous and atypical cells with prominent nucleoli	No growth
#8	64	Male	Metastatic adenocarcinoma	No growth
#9	71	Male	Metastatic lung adenocarcinoma	No growth
#10	79	Male	Atypical cells are noted to have numerous macrophages and reactive mesothelial cells	No growth
#11	67	Male	Atypical cells with mesothelial cells, macrophages and inflammatory cells	No growth
#12	97	Female	Metastatic mullerian carcinoma	No growth
#13	57	Female	Markedly atypical cells in a background of reactive mesothelial cells, macrophages, and lymphocytes	No growth

CONCLUSIONS

- In patients with malignant pleural effusion without evidence of infections, elevated levels of procalcitonin could serve as a prognostic marker for mortality when compared to low or normal procalcitonin levels.
- Our study is limited by its small sample size. Conducting the same with a larger group would be beneficial to increase accuracy and generalizability.
- More research is needed to further explore and/or validate the role of serum procalcitonin as a prognostic biomarker in patients with malignant pleural effusion.

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ACKNOWLEDGEMENTS

Internal Medicine Residency Program at Albert Einstein College of Medicine/ Montefiore New Rochelle Hospital.

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