Evaluation of a biomarkers panel for the diagnosis of cavity effusions

Leila Antonangelo
Division of Clinical Pathology - Department of Pathology
University of Sao Paulo, Brazil
l.antonangelo@hc.fm.usp.br

European Society of Pathology

30th European Congress of Pathology

Pathology: Path to Precision medicine

8 – 12 September 2018, Euskalduna Conference Centre, Bilbao, Spain

Disclosure Information

I hereby declare that I have had business or personal interests in the following industrial enterprises since 1 September 2017:

Name of the enterprise / Nature of the interest

Enterprise | Interest
None

Background

- Malignancy and infection are common causes of pleural and peritoneal effusions
- Laboratory investigation of cavity fluids involves evaluation of biochemical, immunological, microbiological, molecular and cytological parameters
- Routine laboratory exams do not always clarify the etiology of an effusion

Objectives

- To evaluate the performance of a hybrid panel of biomarkers in the diagnosis of diseases that affects the pleura and/or peritoneum

Methods

❖Peritoneal and pleural fluids samples from **120 patients** were assed for:

NGAL (neutrophil gelatinase)
VEGF-A (vascular endothelial growth factor A)
PD-L1/B7-H1 (death-binding pathway)
CEA (carcinoembryonic antigen)
TREM-1 (trigger receptor expressed in myeloid cells type-1)
IFNγ (gamma-interferon)

Luminex®

CALP (Calprotectin) by **ELISA**
ADA (adenosine deaminase) by **enzymatic deamination**

Methods

- From the 120 included samples:

  67 (55.8%) corresponded to Malignant Effusion (ME)
  Pleural: 49; Peritoneal: 18

  28 (23.3%) to Non-Tuberculous Infeccious Effusion (NTBIE)
  Pleural: 22; Peritoneal: 06

  15 (12.5%) to Tuberculous Pleural Effusion (TPE)

  10 (8.3%) to Transudates (TRANS)

Results

Performance of individual and combined biomarkers in the diagnosis of malignant effusion

	VEGF-A	NGAL	PD-L1	CEA	CALP	*VEGF-CEA-NGAL*
S	31.3%	52.2%	4.4%	61.1%	10.0%	82.1 %
E	84.9%	86.7%	92.4%	92.4%	90.0%	75.5 %
PPV	72.4%	83.3%	42.8%	91.1%	62.5%	80.9 %
NPV	49.4%	58.9%	43.3%	65.3%	37.5%	76.9 %
ACU	55.0%	67.5%	43.3%	75.0%	40.0%	79.2 %

S: Sensitivity; E: Specificity ; PPV: Positive Predictive Value; VPN: Negative Predictive Value; ACU: Accuracy.

Results

Performance of individual and combined biomarkers in the diagnosis of non-tuberculous infectious effusion

	TREM-1	CALP	NGAL	*NGAL-TREM*
S	39.3%	33.3%	57.1%	75.0%
E	87.0%	84.6%	84.8%	77.2%
PPV	47.8%	33.3%	57.1%	50.0%
NPV	82.5%	84.6%	84.8%	91.0%
ACU	75.8%	50.0%	80.0%	76.7%

S: Sensitivity; E: Specificity ; PPV: Positive Predictive Value; VPN: Negative Predictive Value; ACU: Accuracy.

Results

Performance of individual and combined biomarkers in the diagnosis of tuberculous effusion

	IFNγ	ADA	*IFNγ-ADA*
S	93.3%	86.6%	100%
E	93.3%	93.3%	87.6%
PPV	66.6%	65.0%	53.6%
NPV	98.9%	98.0%	100%
ACU	93.3%	92.5%	89.2%

S: Sensitivity; E: Specificity ; PPV: Positive Predictive Value; VPN: Negative Predictive Value; ACU: Accuracy.

Conclusion

- ADA, γINF, NGAL, CEA, VEGF-A biomarkers were useful to discriminate tuberculous and malignant effusion

- For NTBIE, NGAL associated to TREM-1 showed to have the best accuracy, although with no diagnostic advantages over the classic parameters LD, pH and glucose