Pancreatic stone protein (PSP) as outcome predictor in patients with cardiogenic shock requiring mechanical circulatory support: a pilot observational study

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Background

Pancreatic Stone Protein (PSP) has been recently suggested as a promising biomarker for early detection of sepsis. Several studies investigated levels and prognostic value of PSP in general ICU patients. However, no study evaluated PSP in the setting of early severe cardiogenic shock (CS) requiring mechanical circulatory support (MCS). Aim of this pilot observational study was to identify level and potential prognostic value of PSP in this specific setting.

Methods

Adult patients with CS requiring MCS were enrolled in this observational study. Patients receiving extracorporeal membrane oxygenation for refractory cardiac arrest or MCS for sepsis-related cardiovascular failure were excluded. PSP level was measured at time of MCS implantation (T0) and then daily for five days (T1-T5) or until death or ICU discharge, whichever came first. Blood samples were analyzed with point-of-care abioSCOPE® device. Outcome data included occurrence of sepsis, length of ICU and hospital stay, and mortality.

Results

A total of 15 patients (median age 70 [65-74]) were enrolled. The majority of patients had post-cardiotomy shock (7 [46%]) and the most frequently used MCS device was intra-aortic balloon pump (10 patients [66.7%]) (Table 1). Daily median PSP levels are presented in Table 1. Median peak PSP level was 556 (257 – 601) ng/mL. A total of 12 patients (80%) had at least one measurement > 250 mg/mL (representing high risk of sepsis).

Six patients (40%) developed sepsis, while in-hospital mortality was 20%. We found no significant correlation between PSP level > 250 ng/mL and occurrence of sepsis (p=0.19). However, patients with

peak PSP level > median had significantly higher risk of sepsis, longer ICU and hospital stay, and a trend towards higher need for upgrade of MCS, despite no difference in peak C-reactive protein, lactate or inotropic score (Table 1).

Variable	Overall (N=15)	Peak PSP < Median (N= 8)	Peak PSP > median (N=7)	p-value
PSP, T0, ng/mL – median (IQR)	141 (62.5 – 222)	97.5 (38 – 175)	390 (179 – 601)	0.09
PSP, T1, ng/mL – median (IQR)	206 (142 – 456)	144 (82 – 216)	251 (161 – 500)	0.06
PSP, T2, ng/mL – median (IQR)	280 (154 – 601)	154 (93 – 257)	601 (335 – 601)	0.005
PSP, T3, ng/mL – median (IQR)	326 (218 – 601)	218 (157 – 257)	545 (409 – 601)	0.009
PSP, T4, ng/mL – median (IQR)	441 (221 – 544)	210 (199 – 225)	532 (659 – 301)	0.02
PSP, T5, ng/mL – median (IQR)	458 (240 – 583)	310 8171 – 371)	601 (565 – 601)	0.02
PSP > 250 ng/mL at any time – no. (%)	12 (80%)	5 (62.5%)	7 (100%)	0.12

Conclusion

Patients with CS requiring MCS display high values of PSP during the early phase of shock. Higher PSP cutoff may be necessary to predict risk of sepsis in this setting. PSP may be a useful marker of disease severity. Future studies exploring the role of PSP in patients with CS are warranted.