



# Detrimental hemodynamic and inflammatory effects of microparticles originating from septic rats

Submitted by Emmanuel Lemoine on Wed, 12/11/2013 - 17:08

Titre	Detrimental hemodynamic and inflammatory effects of microparticles originating from septic rats
Type de publication	Article de revue
Auteur	Mortaza, Satar [1], Martinez, Maria Carmen [2], Baron-Menguy, Céline [3], Burban, Mélanie [4], de la Bourdonnaye, Mathilde R. [5], Fizanne, Lionel [6], Pierrot, Marc [7], Calès, Paul [8], Henrion, Daniel [9], Andriantsitohaina, Ramaroson [10], Mercat, Alain [11], Asfar, Pierre [12], Meziani, Ferhat [13]
Editeur	Lippincott, Williams & Wilkins
Type	Article scientifique dans une revue à comité de lecture
Année	2009
Langue	Anglais
Date	2009/06
Numéro	6
Pagination	2045 - 2050
Volume	37
Titre de la revue	Critical Care Medicine
ISSN	0090-3493

Résumé en anglais

Objective: Microparticles (MPs) are membrane vesicles with procoagulant and proinflammatory properties released during cell activation and might be potentially involved in the pathophysiology of septic shock. This study was designed to assess the effects of MPs from septic origin on the systemic hemodynamics as well as on the inflammatory, oxidative, and nitrosative stresses.Design: A prospective, randomized, controlled experimental study with repeated measurements. Setting: Investigational animal laboratory. Subjects: Forty healthy rats were randomly allocated to three groups: 10 animals inoculated with MPs isolated from control rats (cMPs), 15 animals inoculated with MPs isolated from sham rats (shMPs), and 15 animals inoculated with MPs isolated from rats with peritonitis (sMPs). Interventions: Rats were anesthetized, mechanically ventilated, and infused with the same amount of cMPs, shMPs, or sMPs. We measured the heart rate, mean arterial pressure, carotid artery, and portal vein blood flows. Hemodynamic parameters were recorded during 7 hours, and then animals were killed. Aorta and heart were harvested for further in vitro tissue analyses. Measurements and Main Results: 1) The cellular origin (phenotype) but not the circulating concentration of MPs was different in septic rats, characterized by a significant increase in leukocyte-derived MPs. 2) sMPs but not cMPs or shMPs decreased mean arterial pressure without any effect on carotid artery and portal vein blood flows. 3) Rats inoculated with sMPs exhibited an increase in superoxide ion production and nuclear factor kappa B activity, overexpression of inducible nitric oxide synthase with subsequent nitric oxide overproduction and decrease in endothelial nitric oxide synthase activation. Conclusions: Rats with sepsis induced by peritonitis exhibited a specific phenotype of MPs. Inoculation of sMPs in healthy rats reproduced hemodynamic, septic inflammatory patterns, associated with oxidative and nitrosative stresses.

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DOI	10.1097/CCM.0b013e3181a00629 [15]
Lien vers le document	<a href="http://dx.doi.org/10.1097/CCM.0b013e3181a00629">http://dx.doi.org/10.1097/CCM.0b013e3181a00629</a> [15]

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