

EFFECT OF FLUID RESUSCITATION AND NOREPINEPHRINE COMBINATION THERAPY ON SPLENIC MORPHOMETRY IN SEPSIS INDUCED PIGS (*SUS SCROFA*)

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**STUDY PROGRAM OF VETERINARY MEDICINE
SCHOOL OF VETERINARY MEDICINE
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ABSTRACT

Hans Joshua Peter. Effect Of Fluid Resuscitation And Norepinephrine Combination Therapy On Splenic Morphometry In Sepsis Induced Pigs (*Sus scrofa*). Supervised by EVA HARLINA and SRI MURTINI.

Septic shock is a life-threatening condition characterized by dysregulated inflammation, circulatory failure, and organ dysfunction, including splenic injury. This study evaluated the effects of crystalloid fluid resuscitation with and without norepinephrine on splenic histopathology in a porcine septic shock model. Three healthy pigs (*Sus scrofa*) were assigned to a control group, a sepsis plus fluid therapy (SF) group, and a sepsis plus fluid therapy with norepinephrine (SF+NE) group. Septic shock was induced using intravenous *Escherichia coli* lipopolysaccharide (LPS). Histopathological evaluation included lymphoid follicle number and size, lymphocyte and macrophage counts, and red pulp alterations. The SF group showed fewer but larger lymphoid follicles, whereas the SF+NE group exhibited more numerous but smaller follicles, reduced lymphocyte and macrophage counts, and more severe congestion and hemorrhage. These findings provide new evidence of distinct splenic histopathological responses following fluid resuscitation with or without norepinephrine during septic shock.

Keywords: Histopathology, norepinephrine, septic shock, spleen, *Sus scrofa*.

ABSTRAK

Hans Joshua Peter. Efek Terapi Kombinasi Resusitasi Cairan Dan Norepinefrin Terhadap Morfometri Limpa Pada Babi (*Sus scrofa*) Yang Diinduksi Sepsis. Dibimbing oleh EVA HARLINA dan SRI MURTINI.

Syok sepsis merupakan kondisi yang mengancam jiwa akibat respons inflamasi yang tidak terkendali, gangguan sirkulasi, dan disfungsi organ, termasuk limpa. Penelitian ini bertujuan mengevaluasi pengaruh resusitasi cairan kristaloid dengan dan tanpa norepinefrin terhadap histopatologi limpa pada model syok sepsis babi. Tiga ekor babi (*Sus scrofa*) dibagi menjadi kelompok kontrol, sepsis dengan terapi cairan (SF), dan sepsis dengan terapi cairan serta norepinefrin (SF+NE). Syok sepsis diinduksi menggunakan lipopolisakarida (LPS) *Escherichia coli* secara intravena. Evaluasi histopatologi meliputi jumlah dan ukuran folikel limfoid, jumlah limfosit dan makrofag, serta perubahan pada pulpa merah. Kelompok SF menunjukkan folikel limfoid yang lebih sedikit namun berukuran lebih besar, sedangkan kelompok SF+NE menunjukkan folikel yang lebih banyak namun lebih kecil, disertai penurunan limfosit dan makrofag serta kongesti dan hemoragi yang lebih berat. Hasil ini memberikan bukti baru mengenai respons histopatologi limpa setelah resusitasi cairan dengan atau tanpa norepinefrin pada syok sepsis.

Kata kunci: Histopatologi, limpa, norepinefrin, *Sus scrofa*, syok sepsis.



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PREFACE

The author expresses sincere gratitude for the guidance and support that enabled the completion of this research. The theme chosen for this research, conducted from November 2025 to April 2026, is the “Effect Of Fluid Resuscitation And Norepinephrine Combination Therapy On Splenic Morphometry In Sepsis Induced Pigs (*Sus scrofa*).

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May this work be beneficial to those in need and contribute to the advancement of scientific knowledge.

Bogor, July 2026

Hans Joshua Peter



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