Anesthesiology
V 75, No 3A, Sep 1991

A242

TITLE: DEXTRAN 60 OR FLUID GELATIN FOR FLUID EXPANSION (FE) OF SEPTIC SHOCK PATIENTS.

AUTHORS: J.P. Auffray, M.D., L. Papazian, M.D., G. Perrin, M.D. P. Saux, M.D., C. Martin, M.D.

AFFILIATION: Anes. Dept. University of Marseilles, Sainte Marguerite Hospital 13009 Marseille, France.

In septic shock patients, FE is often required to optimize ventricular preload, prior to the use of inotropic agents. Colloids are known to significantly increase cardiac index (CI) and oxygen delivery (DO_2). This study compares rapid infusion of a dextran 60 (Hemodex® : H) and a modified fluid gelatin (Plasmion ® : P) in two groups of septic shock patients.

After institutional approval and informed consent, 22 patients were randomized into 2 groups. Eleven patients (8 men, 3 women, 63 ± 12 years, 68 ± 12 kg) were given 7 ml/kg IV of H within 20 min (group H) after the injection of dextran 1 (Promit®) to avoid anaphylaxis. Eleven patients (6 men, 5 women, 63 ± 10 years, 67 ± 11 kg) received 7 ml/kg IV of P within 20 min (group P). Before FE, no difference was observed between the 2 groups with regard to anthropometric and hemodynamic parameters studied. The causes of septic shock were : mediastinitis (1), peritonitis (4), pneumonia (5) and septicemia (1) in group P, and peritonitis (3), pneumonia (7) and septicemia (1) in group H.

The effects of FE are given in the table. A significantly greater increase in CI was observed in group H as compared with group P ($p < 0.05$). Oxygen consumption (VO_2) and DO_2 were significantly increased in group H. Likewise significant increase in coronary perfusion pressure (CPP) ($p < 0.02$) was observed in group H. The increase in urinary output was significantly greater in group H than in group P ($p < 0.05$).

	Group before	H after	Group before	P after
mean blood pressure (mmHg)	57 ± 11	74 ± 8*	62 ± 15	69 ± 16*
Heart rate (/min)	119 ± 29	112 ± 24**	107± 15	104± 13
CI (l/min/m^2)	4.4 ± 2.3	5.8 ± 1.9	4.4± 1.6	4.8± 1.7
pulmonary wedge pressure (mmHg)	7 ± 5	13 ± 6*	7 ± 3	12 ± 4*
DO_2 (ml/min/m^2)	602 ± 337	781 ± 288*	575 ± 266	602± 287
VO_2 (ml/min/m^2)	192 ± 103	252 ± 99*	161 ± 77	175± 84
O_2 extraction	0.4 ± 0.2	0.3 ± 0.1	0.3 ± 0.1	0.3 ± 0.2
CPP (mmHg)	39 ± 9	45 ± 10••	42 ± 11	44 ± 13
urinary output (ml/hour)	27 ± 9	75 ± 57••	19 ± 7	42 ± 25+

mean ± SD H : Hemodex® ; P : Plasmion * $p < 0.005$
** $p < 0.002$ •• $p < 0.02$

Since it has more favorable effects on derived oxygen parameters (TO_2, VO_2) and on some hemodynamic parameters (CI, CPP, heart rate, urinary output), H seems a better choice than P for FE in septic shock patients.

A243

Title: SELECTIVE SEPSIS-INDUCED CHANGES IN REGIONAL VASCULAR REACTIVITY TO NOR-EPINEPHRINE AND FENOLDOPAM IN SHEEP

Authors: Eduardo R. Schiffer, Ian M. Schwieger, Olivier Poinsot, Maximo Klohn, Gilles Mentha, Dorothee M. Gaumann, and Denis R. Morel

Affiliation: Laboratory of Experimental Surgery, Departments of Anesthesiology and Surgery, University Medical Center, CH-1211 Geneva 4, Switzerland

Introduction: It has been suggested that the vascular reactivity to pressor substances is modified during septic shock. The purpose of the present study was to examine systemic, renal and splanchnic vascular reactivity to either norepinephrine (N) or fenoldopam (F), a specific dopamine-1 receptor agonist with vasodilating properties[1], during normal conditions and during an established hyperdynamic endotoxin shock in sheep[3].

Methods: After institutional approval by the ethical committee and the veterinary office, twelve sheep weighing 30-40 kg were instrumented with intravascular catheters placed in the aorta, the femoral, jugular, portal (PV) and renal veins, the pulmonary artery (flow-directed thermodilution catheter), as well as with transit-time ultrasonic blood flow probes placed around the PV and the renal (RA), superior mesenteric (MA), coeliac trunc (CT) and hepatic arteries (HA). Pressures and flows were continuously measured and recorded using a computerized on-line data acquisition system. Cardiac output (CO) was determined by thermodilution. Non-splanchnic blood flow (NSBF) was estimated as NSBF=CO-(MA+CT+HA+RA). The studies were started at least 7 days after the surgical preparation in midazolam-sedated sheep. Each animal was studied twice: 1) during control conditions, and 2) 24h after established hyperdynamic septicemia[3] induced by a continuous iv infusion of *E. coli* endotoxin (20 ng/kg·min). After a 30-min period of baseline measurements, F (3 μg/kg·min) or N (1 μg/kg·min) was randomly infused iv for 20min. Following a 3-h recovery period, the 2nd drug was infused. On-line data were averaged for a period of 10min, from 5-15min after starting the drug infusion.

Results: Endotoxemia significantly increased both lactic acid plasma concentrations (from 0.55 to 2.88 mmoles/l) and all baseline blood flows by 36% (RA) to 86% (NSBF) when compared to baseline control conditions. Changes in regional blood flows induced by N or F expressed as the percentage of baseline values during control and septic conditions are presented in Fig. 1. Contrary to the effects produced by N in control conditions, F selectively increased both CT and PV blood flows. This specific effect of F was abolished during endotoxemia, whereas endotoxemia did not significantly modify the vascular response to N. In contrast, HA blood flow was selectively increased by F during endotoxemia only.

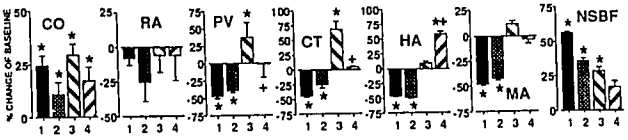

Figure 1. All data mean ± SE; 1: N control; 2: N endotoxemia; 3: F control; and 4: F endotoxemia. * $P < 0.001$ when compared to baseline (drug effect) + $P < 0.01$ when compared to control conditions within same drug group (endotoxin effect) by Student's two-tailed paired *t*-test.

Conclusion: These results indicate that endotoxemia does not modify the splanchnic vascular reactivity to N. In contrast, the F-induced selective CT and PV vasodilation is abolished during endotoxemia, but partially compensated by an increase in HA blood flow. This preliminary study suggests that F may be at least partially beneficial in septic-induced hepatic failure.

References: 1. Hahn RA, et al. *J Pharmacol Exp Ther* 223:305-13, 1982

2. Meadows D, et al. *Crit Care Med* 16:663-6, 1988

3. Pittet JF and Morel DR. *Circ Shock* (in press)

Supported by the Swiss National Science Fund no. 32-9542.88.