TITLE : HORMONAL THERAPY IN HUMAN BRAIN-DEAD POTENTIAL ORGAN DONORS : COMPARATIVE STUDY

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Brain death entails substantial reductions in certain circulating hormones, mainly triiodothyronine (T3) and cortisol. These alterations may lead to instability in body metabolism and hemodynamics, and result in organ impairment of the donor [1,2]. Therefore thyroid and adrenal cortex hormonal replacement therapy is a new concept in the management of organ donors [3,4].

The aim of the study was to evaluate the improvement in metabolism and hemodynamic stability with reduced inotropic support in brain-dead organ donors (BDOD) with hormonal therapy (HT) associated with conventional management (CM).

Two randomized double-blinded groups of 20 adult BDOD were studied (with approval by the ethic committee, Univ. of Nancy, France) : one received HT (T3 2 µg and cortisol 100 mg, administered at hourly intervals intravenously), the other received placebo (P). Both groups had the same CM of BDOD. The parameters monitered were hemodynamic (heart rate, arterial blood pressure, central venous pressure, cardiac output, thoracic fluid index, systemicvascular resistances, diuresis, dosage of inotropic drugs) and metabolic (central temperature, arterial blood gas, pH and bicarbonate, plasmatic and urinary sodium and potassium, glycemia, insulin and bicarbonate requirement).

The 2 groups were comparable (age, sex, etiology of brain death, delay between brain death and start of the protocol). There was no statistically significant difference between the 2 groups in the following parameters : hemodynamic profile : improvement (HT : 9 cases versus P : 10 cases), stability (9 vs 6), deterioration (2 vs 4) ; inotropic drugs requirement : increased (2 vs 4), stable (3 vs 3), decreased (15 vs 13) ; mean dosage of dobutamine (3.07 ± 4.23 vs 2.47 ± 3.77 $\mu g.kg^{-1}.min^{-1}$) ; metabolic acidosis (5 vs 5) ; increased insulin requirement (4 vs 3) ; increased urinary Na^+/K^+ ratio (4 vs 7).

Our results are in disagreement with the first published study in humans[4], which was neither randomized nor double-blinded.

In conclusion, hormonal therapy did not significantly improve BDOD stability. Conventional management with strict fluid and electrolyte balance maintenance allows hemodynamic and metabolic stability with no or very low inotropic support.

References
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TITLE: COMPARISON OF THE IMPOSED WORK OF BREATHING BETWEEN A FLOW REGULATED CPAP SYSTEM AND A DEMAND FLOW CPAP SYSTEM

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To reduce the imposed work of breathing (Wimp), we have previously developed a flow regulated CPAP (FR-CPAP) system consisting of an electro-pneumatic regulator, a personal computer and a pneumotachograph placed between the endotracheal tube and a breathing circuit including a mushroom type-PEEP valve (1). This system delivers a basal flow of 30 L/min and regulates this basal flow every 20 msec to match the patient's flow demand as measured by the pneumotachograph. During inspiration, a gas flow equivalent to the patient's inspiratory flow is added to the basal flow, and during expiration, a gas flow equivalent to the patient's expiratory flow is subtracted from the basal flow.

This study was designed to compare the Wimp between the FR-CPAP system and a demand flow CPAP (DF-CPAP) system (consisting of a Servo 900C, a Bear 5 and a Puritan-Bennett 7200a). The CPAP level was set at 5 cmH O, and the trigger sensitivity of the DF-CPAP system was set at -1cmH O. A model lung (TTL, Michigan Instruments) was used to simulate spontaneous breathing and was adjusted to deliver a tidal volume of 400 ml and a respiratory rate of 20 breaths/min. A pressure transducer and an ultrasonic flowmeter were placed between the model lung and the CPAP apparatus to measure airway pressure (Paw) and flow. The signals were processed through a microcomputer (OMR-7101, Nihonkohden, Japan) to construct a pressure (Paw)-volume curve for calculating the Wimp.

The total Wimp of the FR-CPAP system, Servo 900C, Bear 5 and Puritan-Bennett 7200a were 34, 466, 366 and 976 g·cm/breath, respectively (Fig. 1). These results suggest that the FR-CPAP system could efficiently minimize the Wimp of a patient on CPAP.

Reference:
1. Akashi M, Sakanaka K, Noguchi H, et al: Flow regulated CPAP: A new CPAP to minimize the imposed work of breathing. Crit Care Med 1990, (in press)

Fig. 1 Pressure-volume curves of each CPAP system.