

**TITLE:** EFFECT OF THE MAST ON INTRACRANIAL PRESSURE IN CHILDREN

**AUTHORS:** Ph MEYER MD, P JAYAIS MD, G QUENET MD, G BARRIER MD.

**AFFILIATION:** Dept Anesth Reanimation, hôpital des Enfants Malades PARIS, FRANCE.

Military antishock trouser (MAST) is a widely used device in emergency trauma practice 1. However the fear of increasing intracranial pressure (ICP) makes the use of MAST contraindicated in the presence of head injury 2. The aim of this study was to establish the effect of MAST and the influence of different positioning on ICP in children.

After the Hospital committee approval twelve ASA 1 or 2 physical status children were included. These children had extradural ICP monitoring for suspected intracranial hypertension. The study was performed just before monitoring removal under premedication with 0.3 mg.kg-1 of midazolam. ICP, automated non invasive blood pressure and derived cerebral perfusion pressure (CPP) were studied in the following five different circumstances: supine (T0), after MAST inflation in the supine position (T1), with head trunk-lift of 10° (T2), 30° (T3) and in the sitting position (T4), after MAST deflation in the sitting position (T5). The MAST was used with 40mmHg pressure in the lower limb compartment and a

30mmHg pressure in the abdominal compartment. Statistical analysis was performed using Student paired t test and multivariate analysis, the statistical significance was with  $p < 0.05$ .

The MAST produced a 30% rise in ICP without detectable effects on BP and CPP in supine position. A head lift of 10° was sufficient to reduce the ICP to its control value (T0). No significant difference was noted with others positions (table). It can be concluded that the MAST inflation induces a mild rise in ICP; that can be eliminated with a 10° head lift and can be used safely in the presence of head trauma in children.

Table: Results = mean  $\pm$  SD

	T0	T1	T2	T3	T4	T5
ICP	10.5 $\pm$ 5	13.8* $\pm$ 5	10.5** $\pm$ 4	9.3 $\pm$ 5.1	8.6 $\pm$ 5	5.8 $\pm$ 5.2
BP	87.8 $\pm$ 4	88.8 $\pm$ 5	83.8 $\pm$ 6	82 $\pm$ 3	82.1 $\pm$ 6	79.3 $\pm$ 7
CPP	77.3 $\pm$ 6	75 $\pm$ 9	72.8 $\pm$ 8	72.5 $\pm$ 6	73.6 $\pm$ 8	73.5 $\pm$ 8

\*p < 0.05 Vs T0

\*\*p < 0.01 Vs T1

**References:**

- 1) JAMA 252, 2598-2603 1984
- 2) J.Trauma 21, 55-59 1981

**A1101**

**TITLE:** PREVENTION OF VENOUS AIR EMBOLISM IN PEDIATRIC NEURO SURGICAL PROCEDURE BY USING M.A.S.T.

**AUTHORS:** Ph MEYER MD, P JAYAIS MD, G QUENET MD, G BARRIER MD.

**AFFILIATION:** Dept Anesth réanimation hôpital des Enfants Malades; PARIS, FRANCE.

The use of the sitting position in neurosurgical procedure remains controversial because of the risk of perioperative venous air embolism (VAE) 1. Prevention of VAE by military anti shock trouser (MAST) associated with mild PEEP has been used in adults with good results 2. The aim of the study was to establish the safety and the efficiency of the MAST in raising venous pressure above the level at risk for VAE in children less than 12 years old assigned for neurosurgical procedures in the sitting position.

After approval by the hospital ethics committee and parents informed consent; this study included 30 ASA 2 or 3 physical status children, mean age: 7.7  $\pm$  4.1 years; mean weight: 25.4  $\pm$  10.5 kg. Detection of VAE was based on capnography. Right atrial pressure (RAP), invasive arterial blood pressure (BP), jugular bulb venous pressure (JBVP) (in 10 patients, by retrograd catheterisation) monitoring were insured. A PEEP level of less than 10 cm-1 water was systematically added. Data were collected at following circumstances: supine position (1), sitting (2), MAST inflated (3), MAST inflated plus PEEP (4). Statistical analysis was performed by using paired Student t test and multivariate analysis (table 2).

No detectable VAE nor deleterious side effects were noted comparing these results to one previous study of patients

operated without MAST and no PEEP. This method reduced the incidence of VAE from 20% to 0% (table 1). Regarding surgical exposure, perioperative blood loss and post operative outcome, no difference were noted between the two groups. Inflation of the MAST induced a dramatic rise in RAP and in JBVP. This increasing pressure is linear in children. This effect was reinforced by the addition of a low PEEP level. No systemic variation in blood pressure occurred.

It can be concluded that the MAST suit in children is an efficient method of prevention of VAE; thus allowing the continued rise of the sitting position in pediatric neurosurgery

Table 1 = Results

	supine (1)	sitting (2)	MAST (3)	MAST (4) +PEEP
RAP	3.4	0.68	9.5	11.8
BP	75	63.6	73.77	74.19
JBVP	1.7	0.06	8.13	10.06

Table 2 = Statistical results

	1 Vs 2	2 Vs 3	3 Vs 4
RAP	< .0001	< .01	< .0004
BP	< .2	NS	NS
JBVP	< .0001	< .0001	< .0035

**References**

- 1) Anesthesiology 57.338-339 1982
- 2) Anesthesiology 69.A 553 1988