

## INFLUENCE OF NOISE ON BLOOD COAGULATION.

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Subtle evidence exists that exposure to higher level of noise, beyond a critical normal limit of 85 decibels (db), leads to development of systemic hypertension, abnormal ECG changes, and impaired function of cardiac muscle in man. Its effects on blood coagulation are not known.

A study was conducted in albino female rats, 5-6 months old, which were exposed to a continuous noise of 110 db, for 2 hr daily, 5 days a week, over a period of 3 weeks. Four groups, each of 8 rats, were studied. The unexposed animals acted as controls. The desired level of noise was generated by masking system of an audiometer. Bleeding time (BT), plasma fibrinogen levels, and the activated partial thromboplastin time (APTT) were estimated before and after the noise exposure.

Compared with controls, the noise exposure resulted in significantly prolonged BT (from  $56.9 \pm 5.2$  to  $79.9 \pm 11.8$  sec), higher plasma fibrinogen levels (from  $116.7 \pm 6.5$  to  $177.5 \pm 6.9$  mg/dl), and progressively shorter APTT (from  $15.6 \pm 1.01$  to  $13.9 \pm 1.08$  sec) in the test animals at the end of three weeks.

These changes are suggestive of coagulopathy induced by the noise stress. These adverse changes in blood coagulation, if confirmed in man, may predispose him to heart diseases. Those suffering from myocardial infarction and hypertension do overreact to adverse audiogenic stimuli by a rise in cortico-adrenal activity, plasma cholesterol, and 17-HOCS levels. This study indicates the need for an enquiry in the coagulation mechanism in humans exposed to varied degree of noise. Noise, therefore, poses a grave threat to environmental health.

HAEMORRHAGIC DISORDERS FOLLOWING LIVER CELL NECROSIS. PATHOGENETIC INVESTIGATIONS IN PIGS. H.-M.Fritsche, St.v.Somogyi A.Stemberger, M.Fischer, G.Blümel. Institute for Experimental Surgery and Department of Surgery of the Technical University Munich, FRG.

It is well known that acute hepatic failure due to liver cell necrosis is frequently complicated by severe haemorrhagic disorders.

In order to establish a therapeutic concept we have studied the pathogenetic mechanism of the clotting changes in a reproducible animal model. Pigs were exposed to complete liver ischemia for 180 min resulting in liver cell necrosis. Before, during and after temporary liver ischemia clotting changes were investigated by global and specific tests up to 48 hours after the ischemic lesion. The concentration of the coagulation factors I, II, X (measured with chromogenic substrates), V and VII (measured with deficient plasma) decreased significantly after the liver ischemia. The disappearing rate of factors with short and long half life time was nearly identical. Simultaneously fibrinogen-fibrin-degradation-products and thrombocytopenia and -pathy were observed. Besides this the plasmatic inhibitors antithrombin III (AT III) and antiplastin as well as plasminogen (measured with chromogenic substrates) decreased markedly showing minimum values 24 hours after the ischemic lesion. However, an increase in endogenous heparin liberation was not detected.

These clotting changes seem not to be conditioned by defect synthesis of the liver derived coagulation factors exclusively. Our findings indicate that disseminated intravascular coagulation (DIC) and hyperfibrinolysis play a major role in development of the haemorrhagic disorders in acute hepatic failure. Monitoring of AT-III-levels in plasma proved to be suitable in early diagnosis of these clotting disturbances and for the prognosis as well. Since AT-III-deficiency enhances DIC for clinical purpose substitution of AT III prior to application of plasmatic clotting factors and heparinization seems to be the treatment of choice in early stage of hepatic failure.

## INFLUENCE OF YOGA ON BLOOD COAGULATION.

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Yoga, an ancient Indian cult, is known to endow one with perfect physical, mental and spiritual health. Its effect on blood coagulation is not known. A pilot study was conducted. Seven adult males underwent a combination of yogic exercises, daily one hour, for 4 months. Parameters of blood coagulation were estimated before commencement of yoga and then repeated at the end of training. These included: haemoglobin (Hb) gm/dl, haematocrit (Hct), blood platelet counts in thousands/cu mm, activated partial thromboplastin time (APTT) sec, platelet aggregation time (PAT) sec, fibrinogen mg/dl, and euglobulin fibrinolytic activity (FA) measured as area of lysis in sq mm. Final results were compared with the initial ones. All values are expressed as Mean  $\pm$  SEV.

Following yoga, Hb showed a significant rise from  $13.5 \pm 0.1$  to  $14.5 \pm 0.3$  and so did Hct from  $44.5 \pm 1.1$  to  $49.3 \pm 1.2$ . FA increased significantly from  $271 \pm 36$  to  $443 \pm 64$ , it was accompanied by a fall in fibrinogen from  $254 \pm 17$  to  $202 \pm 10$ . APTT prolonged from  $16.4 \pm 0.2$  to  $17.4 \pm 0.7$  and so did PAT from  $33.0 \pm 3.2$  to  $40.1 \pm 9.0$  though differences here were not significant. Blood platelet counts showed a marginal but significant rise from  $336.6 \pm 26.3$  to  $391.6 \pm 10.0$ .

This study suggests that yoga induces a state of hypocoagulability evident by raised FA, fall in fibrinogen, suppressed platelet activity and low levels of activated clotting factors. Yogic exercises, therefore, may be instituted for prevention of cardiovascular and thrombotic disorders in man. Benefits of yoga seem to accrue from parasympathetic dominance and sympathetic quiescence of the autonomic nervous system brought about by yoga.

COMPUTED TOMOGRAPHY DETECTION OF HEMORRHAGIC AND THROMBOTIC DISORDERS. Rogelio Moncada, Harry L. Messmore, Leon Love, Zaheer Parvez, Jawed Fareed and Mark Baker, Loyola University Medical Center, Maywood, IL 60153, U.S.A.

The ability of computed tomography to detect minimal differential changes in the x-ray, tissue absorption coefficient has been utilized to diagnose clot associated radiodensity alterations in a variety of clinical settings. Freshly extravasated blood generally exhibits greater radiodensity than circulating blood and a progressive diminution in the clot radiodensity is observed over a period of approximately 4 weeks. This phenomenon has been successfully employed in the diagnosis of intracranial hemorrhage and their sequelae. A similar approach has been used to detect hemorrhagic and/or thrombotic incidents in the torso. The following categories have been examined.

- 1) Intravascular thrombosis.
  - a) Ascending Aorta
  - b) Abdominal Aorta
  - c) Superior Vena Cava
  - d) Inferior Vena Cava
  - e) Lower Extremity
- 2) Visceral and Peri-Visceral Hemorrhage.
  - a) Spleen
  - b) Liver
- 3) Spontaneous or Induced-Muscular and Fascial Hemorrhage.

The efficacy to detect recent hemorrhage and the ability to sequentially follow the resolution of the clot by computed tomography opens a new avenue in the diagnosis and clinical management of thrombo-hemorrhagic events.