

# Cyanamide-Induced Hepatotoxicity and the Potential Protective Role of Pomegranate Seed Extract in Adult Male Albino Rats

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**Abstract** Background: Dormex, which is used as agricultural fertilizer, contains cyanamide as an active ingredient. Pomegranate fruits enclose numerous polyphenols that guard normal cells against oxidative stress. Aim of the work: to study the hepatotoxic effects of Dormex and assess the protective capacity of pomegranate seed extract (PSE) in rats after 3 months of oral administration. Materials & methods: Sixty mature male albino rats were distributed to; Group I, II: rats were given 0.1 ml distilled water/kg/day and 400 mg/kg/day of pomegranate seed extract (PSE), respectively. Group III: divided into two subgroups in which rats received 30 & 60 mg/kg/day Dormex, respectively. Group IV: divided into two subgroups in which rats were given the same dose of Dormex plus PSE. Body and liver weights, serum albumin, total bilirubin and liver enzymes were assessed. Hepatic malondialdehyde (MDA), glutathione reductase and catalase activities were evaluated. Liver specimens were studied with H. &E., Mallory's trichrome and caspase-3 immunostaining. Results: The hepatic index, liver enzymes, bilirubin, and MDA were significantly increased ( $P < 0.001$ ), while albumin, glutathione reductase, and catalase were lowered significantly in rats of experimental groups compared to the control ( $P < 0.001$ ). All these assessed parameters were within normal range in the protected groups. The histopathological changes included liver inflammation, degeneration and fibrosis, in addition to apoptosis. Treatment with PSE markedly prevented the occurrence of these abnormalities. Conclusion: Cyanamide prompts oxidative stress that compromises the liver function and eventually liver fibrosis results. These toxic effects are dose related. The PSE exhibits hepatoprotective effects and highlights the possibility of its use as a protective agent in individuals at high risk of Dormex toxicity.

# **Forensic and clinical significance of serum amylase, lipase and gamma glutamyl transferase as predictors of outcome in head injured patients**

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## **ABSTRACT**

Head trauma is one of the leading causes of death and disability worldwide. Combined head lesions consist of more than one form of lesions. Biochemical markers of brain injury are used in determining the extent of brain injury and predicting its outcomes. The aim of this study was to investigate the forensic and clinical significance of serum amylase, lipase and gamma glutamyl transferase (GGT) as predictors of the outcome in head injured patients. Patients and methods: Sixty head injured patients were enrolled and subjected to personal history taking, general and local physical examination. Glasgow coma scale (GCS), head computed tomography scan and pelvi-abdominal ultrasound were performed. Two blood samples (each 3 mL) were drawn at the time of admission and after 24 h for measuring serum amylase, lipase and GGT levels using special kits. Results: Most cases of head trauma occurred accidentally during daytime, in the street as a result of falls and road traffic accidents (RTA). Significant increase of serum amylase, lipase and GGT levels on re-evaluation after 24 h from admission were demonstrated in combined head lesions. There was a high significant negative correlation between GCS and these enzymes both on admission and 24 h after admission. Serum levels of measured enzymes were significantly higher in non-survivors as compared to survivors. Conclusion: Serum amylase, lipase and GGT are good predictors of the outcome in head injured patients. This could be useful for forensic experts to deduce that the poor outcome of the victims was primarily related to the effects of head trauma and its sequences.

# **Electric injury-induced Purkinje cell apoptosis in rat cerebellum: Histological and immunohistochemical study**

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## **A B S T R A C T**

**Introduction:** Electrical injury is a prominent problem in low income countries with increased morbidity and mortality rate. Nervous system is one of the most susceptible systems to electrical current because of its low resistance. There were different studies demonstrated electrocution effect on the nervous system, however little was made on the cerebellum. **Aim:** This study was conducted to produce an experimental suggestion concerning injury of the nervous system through evaluating Purkinje cell apoptosis and number in rat cerebellum by fatal and non-fatal electric current using histological and immunohistochemical study. Also to support the diagnosis of electrocution as a probable cause of death and delayed neurological damage as well as disability. **Materials & methods:** Fifty male Wistar rats were divided into five groups (10 rats each); control group: normal rats that were sacrificed without exposure to electric current, groups 1–3 (non-fatal electrocution groups): rats were exposed to alternating electric current (220 v, 50 Hz) for one minute then were sacrificed immediately, after 2 h, and after 4 h respectively, and group 4 (fatal electrocution group): rats were sacrificed after being electrified up to death (153 ± 27 s). Sections from cerebellum were processed for histological and caspase-3 immunohistochemical study. **Results:** Purkinje cells showed marked histopathological changes in the form of shrunken dark stained cells with significant reduction of their number in H & E stained sections when compared to control, widespread argyrophilia, and degenerated organelles along with shrunken irregular nuclei. For caspase-3 staining, there was significantly increased number of caspase-3 positive cells in groups 1–3 (non-fatal electrocution groups) and markedly increased in group 4 (fatal electrocution group) in comparison to control group. These changes were gradually increased with the increased duration after exposure to the electric current. **Conclusion:** Apoptosis and loss of Purkinje cells were involved in the pathogenesis of immediate and long term effect of electrical injury on Purkinje cells, which will be an aid to the forensic pathologist to determine the cause of death and residual damage as well as disability after electric shock.

# Estimation of Early Postmortem Interval Through Biochemical and Pathological Changes in Rat Heart and Kidney

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## Abstract:

Accurate estimation of time passed since death is a complicated task in forensic medicine especially in homicide or unwitnessed death investigations. Changes in oxidant/antioxidant parameters were investigated if it can be relied upon in estimating the early postmortem interval (EPI) in rat heart and kidney, and whether these changes were correlated with histopathological findings in these tissues. Heart and kidney tissues of 84 male albino rats were divided into 2 parts. One part used for estimation of levels of malondialdehyde (MDA), nitric oxide (NO), and total thiol as well as the activity of glutathione reductase (GR), glutathione S transferase, and catalase. The second part was examined histopathologically. It was found that MDA and NO were significantly increased earlier in the heart than kidney tissues. Meanwhile, total thiol, catalase, glutathione S transferase, and GR were commenced to be significantly decreased in the heart before kidney tissues. Linear regression analysis of independent variables of heart was found to be of a high predictive value of 97.2% ( $EPI = 8.607 - 0.240 GR + 0.002 MDA + 0.014 NO$ ). Structural deterioration of heart started 3 to 4 hours compared with renal sections that began 5 to 6 hours after death. The relationship between oxidant and antioxidant parameters is crucial in determining the EPI. The kidney was found to be more resistible to oxidative damage. Further research on humans is needed.

# **Comparative Study for Estimation of Stature from Tibial Length in Egyptian and Bengali Adult Population**

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## **ABSTRACT**

Forensic anthropologists employ in estimating stature from fragmented body parts or human skeletal remains. This study was aimed at investigating the inter-racial difference between adult Egyptian and Bengali populations regarding the body stature and tibial length, developing regression equation formulae using the percutaneous length of tibia (PCTL) to estimate stature. Four groups of adult male and female Egyptian and Bengali subjects aged >21 were recruited randomly. Body height and PCTL were measured using the standard anthropometric technique. The means of the stature of the studied groups exhibited significant differences between all groups ( $p < 0.001$ ) except in Egyptian females versus Bengali male ( $p = 0.067$ ). There was no significant difference within the same sex of both ethnic groups regarding the tibial length (Females  $p = 0.490$ ) and (Males  $p = 0.905$ ). The measured parameters of males were significantly higher than the corresponding female values. The linear regression equations derived for male and female Egyptian were  $94.080 + 2.145 \times T (\pm 3.57)$  and  $76.617 + 2.375 \times T (\pm 3.89)$ , respectively. Those for male and female Bengali were  $92.500 + 1.870 \times T (\pm 2.93)$  and  $105.563 + 1.473 \times T (\pm 2.39)$ , respectively. It was concluded that the derived equations are flexible and retain realistic standard errors that can be used for stature estimation using the length of an intact mutilated

leg. These equation formulae are Sex and ethnic specific. Thus, they should be endorsed in anthropological studies for stature estimation among the ethnic groups under this study.

## RED CELL DISTRIBUTION WIDTH, NEUTROPHIL LYMPHOCYTE AND PLATELET LYMPHOCYTE RATIOS AS PROGNOSTIC MARKERS IN ACUTELY PESTICIDES-POISONED PATIENTS

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### ABSTRACT :

Egypt like other developing countries use pesticides widely to increase crops production and prevent spread of certain diseases. However, pesticides poisoning is considered as a public health problem as it is associated with high morbidity and mortality. Objectives: evaluation the red cell distribution width (RDW), neutrophil lymphocyte ratio (NLR) and platelet lymphocyte ratio (PLR) as prognostic markers in acutely pesticidepoisoned patients.

### Methodology:

eighty patients with acute pesticide poisoning who admitted to Toxicology Unit of Emergency Hospital, Tanta University, were classified into three groups according to their outcome. Three mL of venous blood were drawn for performing complete blood count (CBC), and were analyzed by hematology analyzer machine. The RDW, NLR, and PLR were assessed.

### Results:

Most of patients were male (82.5%), and farmers (82.5%). (75%) of patients exposed to pesticides through mixed routes by accidental manner (87.5%). The most common pesticide was the anticholinesterases (67.5%). Patients of group (3) had the significant highest total WBCs, neutrophils and platelets counts ( $P < 0.001$ ). Significant

lymphopenia was found in patients of group (3). Moreover, group (3) had significantly higher RDW% ( $15.49 \pm 0.91$ ), NLR (median 8.63, IQR 7.00-10.33) and PLR ( $362.51 \pm 59.45$ ) than groups 1 & 2 ( $P < 0.001$ ). ROC curves showed cut off values of RDW%  $\geq 14.3$

(sensitivity 93.8% and specificity 83.3%), NLR  $\geq 6.49$  (sensitivity 87.5% and specificity 95.8%), and PLR  $\geq 292.87$  (sensitivity 87.5% and specificity 91.7%). These parameters were significantly related to the patients outcome ( $p < 0.001$ ). Plasma cholinesterase enzyme activity was correlated significantly and negatively with RDW%, NLR and PLR ( $P < 0.001$ ).

Conclusion: Measured RDW%, NLR, and PLR are useful, valuable, inexpensive and easily accessible parameters in estimating prognosis and the follow-up of patients with acute pesticides poisoning.