

*Research Article***Testicular changes after non fatal electrical injury.****Abdel -Azim E. K., Nisreen A.A. Osman, Hishmat A. M. and Elewa R. A**Department of Forensic Medicine and Clinical Toxicology, Faculty of Medicine, Minia University,  
Department of Pathology, Faculty of Medicine, Minia University,**Abstract**

**Introduction:** Electrical injury (EI) can be defined as damage caused by generated electrical current passing through the body. Electrical injuries are an emerging health problem in developing countries due to the widespread use of electrical appliances with lack of awareness regarding safety issues among the general population. **Aim of the work:** The aim of this study is to detect histopathological changes in testes and to evaluate the expression of Caspase-3 in testes of electrically injured rats by non-fatal electrical current. **Material and Methods:** This work was done in forensic medicine and clinical toxicology department, faculty of medicine, Minia University. This study included 60 male albino rats with average weight 200-250 gm were used. This study was done to detect histopathological changes in testes and to evaluate the expression of Caspase 3 in testes of electrically injured rats by non-fatal electrical current. All animals were given free access to standard pellet chow and water prior to the experiments. All procedures were approved by the Ethical Committee of Minia University. **Results:** there were significant histopathological changes in testes of the experimental animals as well as significant increase in the expression of caspase 3 among experimental groups. **Conclusion:** the main pathogenesis of electrical injury on testes was apoptosis and confirmed by histopathological changes and elevated caspase 3 level.

**Keywords:** Electrical injury, testes, apoptosis, caspase 3**Introduction**

Electric shock can be used also in treatment of fibrillation even in all types of irregular heart rhythm, which is called direct current cardioversion where electrical shock is delivered through chest wall to heart through special electrodes which is applied to the skin of the chest so it restore normal heart rhythm so repeated exposure to electric shock may affect body organs especially testis and ovary (shih et al., 2017).

Apoptosis is a physiological process, which needs ATP (Resendes et al., 2004). Apoptosis is necessary for normal spermatogenesis and oogenesis in mammals and sustains cellular hemostasis. This physiological process conserves the equilibrium between sertoli cells and germ cells and even in cells of ovarian follicles (Said et al., 2004). The members of the caspase family play a key role in the regulation of the apoptosis in seminiferous tubules (Tres and Kierszenbaum, 1999). Previous studies showed that germ cells of testes died via apoptosis (Allan et al., 1992;).

**Material and Methods****Induction of electrical injury**

According to Wang et al., (2006), rats of the experimental groups were subjected to an electric current via an electrical energy transfer device consisted of a double copper cable with a pair of ends. One end peeled 1 cm in length and the other connected to an electrical energy source (conveying AC of 220V, 50Hz alternating current). The animals were fixed on a plate and one clamp connected to rat left hind limb while the other to right forelimb.

**Experimental design**

This study included 60 male albino rats with average weight 200-250gm were used. This study was done to detect histopathological changes in testes and to evaluate the expression of Caspase 3 in testes of electrically injured rats by non-fatal electrical current. All animals were given free access to standard pellet chow and water prior to the experiments.

**Haematoxylin and Eosin (H&E)**

Stain In brief, sections were deparaffinized and were hydrated followed by staining with H&E.

**Immunohistochemical examination:**

Sections were deparaffinized, rehydrated and placed in 0.3% hydrogen peroxide/methanol for 20 min to block endogenous peroxidase activity. Then, sections were immersed in 10 ml of citrate buffer (pH 6) and microwaved. Afterwards, blocking of non-specific protein binding sites through treating sections with a serum-free protein blocking solution for 20 min at room temperature. Next, the sections were incubated at 4\_C with a 1:50 dilution of anti-caspase-3 antibody (R&T system (Biotechnne brand))

followed by incubation with the secondary antibody. After that, 1–2 drops of diaminobenzidine was applied to the sections, counterstained with hematoxylin, dehydrated, cleared and were examined by light microscope.

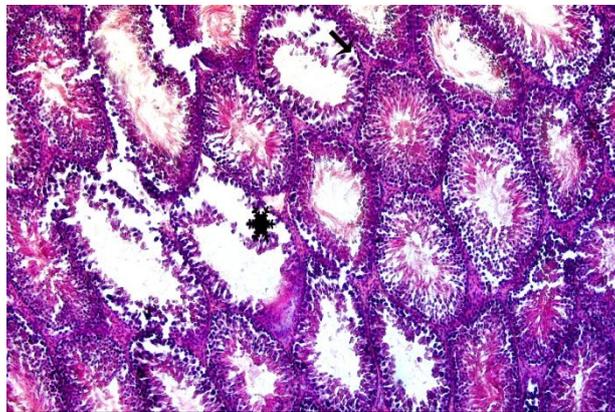
**Statistical analysis**

Data were statistically analyzed using SPSS program. One way ANOVA test with Post HOC Correction was used to compare the means of three groups.

**Results**

**H&E results**

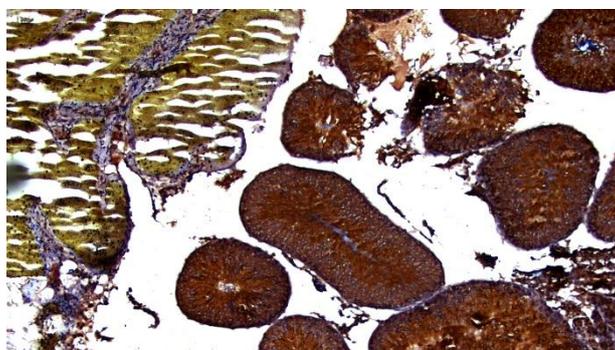
there were significant histopathological changes in testes of the experimental animals as shown in figure 1.



**Fig.1. disruption of the basement membrane of seminiferous tubules with sever hemorrhage in stroma**

**Immunohistochemical results**

there were significant expression of caspase 3 in testes of the experimental groups as shown in figure 2.



**Fig. 2. Positive caspase 3 expression in testes**

## Discussion

Electric shock can be used also in treatment of fibrillation even in all types of irregular heart rhythm, which is called direct current cardioversion where electrical shock is delivered through chest wall to heart through special electrodes which is applied to the skin of the chest so it restore normal heart rhythm so repeated exposure to electric shock may affect body organs especially testis and ovary (shih et al., 2017).

Apoptosis is a physiological process, which needs ATP (Resendes et al., 2004). Apoptosis is necessary for normal spermatogenesis and oogenesis in mammals and sustains cellular hemostasis. This physiological process conserves the equilibrium between sertoli cells and germ cells and even in cells of ovarian follicles (Said et al., 2004). The members of the caspase family play a key role in the regulation of the apoptosis in seminiferous tubules (Tres and Kierszenbaum, 1999).

## Summary and Conclusion

Electrical injury affects testes by causing cell apoptosis which confirmed by histopathological and immunohistochemical results.

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