Influence of the different doses of sodium fluoride on the rabbit exocrine pancreas. Histo – pathological study

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Abstract:
The present study was carried out on the (18) male rabbits, to identify the effect of different concentration of sodium fluoride on histological structure of rabbits exocrine pancreas. The experimental animals were randomly divided into three groups, control group, the first treated group admimenstreted (200) ppm sodium fluoride daily with drinking water for six week period. The second treated group adimenstered (300) ppm sodium daily in drinking water with same experiment period, each group was included six male rabbits. The moderate histological pathological alterations was occurred in the rabbits exocrine pancreas, represent by degenerative changes in the pyramidal cells of acini and lost of zymogenic granules in some acinar cells while the sever histo-pathological changes in the histological structure units of the rabbits exocrine pancreas in the second treated group involved sever degeneration, necrosis and a trophy from other hand enlargement of interstitial and intralobular ducts.

Introduction
Fluoride salt are commonly used to inhibit the activity of phosphatases such as serine/ threonin phosphatases (1). It may do this by replacing the nucleophilic hydroxyl ion in these enzymes active sites (2). A few organofluorine compounds are extremely toxic, such as organophosphates like serine and diisopropyl fluorophosphates that react with cholinesterase enzyme at neuromuscular junctions and thus block the transmission of nerve impulses to muscles (3). Sodium fluoride is a crystalline mineral once widely used in the united states for control of larvae and crawling insects in homes, barns, ware houses and other storage area, it is highly toxic to all plant and animal life (4). The previous studies about the effect of sodium fluoride on the pancreas was carried out by (5,6,7) in the monkey and rats. The effect of fluoride on pituitary gland and pineal body was study by (8) he mentioned the absorption of fluoride from pituitary gland characterized by more rapid absorption when compared with fluoride absorbed from loose connective tissues, and reduce the melatonin production from pineal body which led to sleeping disturbance effect of fluoride on major salivary glands, parotid and submandibular salivary glands, to identify the amylase and carbonic anhydrase activity was conducted by (9,10). The aim of present study to recognize the histo-pathological changes on the rabbit pancreas due to effect of sodium fluoride at different does.

Material and methods
The study was carried out on the 18 male rabbits, 12 week old, the mean average weight (1250) gram. The rabbit were randomly distributed in three groups, one control, and two treated groups containing six males rabbit each. The rabbits were managed under standard conditions, at temperature (25)C◦ and light period 12 hour, they had been given ration and drinking water *ad libitum*. The first treated group administered sodium fluoride with drinking water at dose (200) ppm/daily. The second treated group administered (300)ppm of sodium fluoride/daily while the control group took clean drinking water was devoid from sodium fluoride. The experimental period reached six week, after that the rabbits were sacrificed by using ether as anesthesia, the pancreas were removed from carcasses and put in normal saline, then fixed in neutral formalin (10%) for period (48) hour, routine histological preparations were conducted, special and routine stains, such Gomori stain, aldehydefuscin stain and Hematoxylin–Eosin stain were used according to (11).

**Results and Dissection**

The present study revealed that, the rabbit pancreas is located in the mesenteries which suspended in the descending and ascending of the duodenal loops in the abdominal wall, it's appeared as lobes and lobules distributing in the mesenteries. The rabbit pancreas was mixed exocrine and endocrine gland, the exocrine portion consists of compound tubule – acinar secretory units, which represented by acini and ductal system. The exocrine pancreas was surrounded the islets of Langerhan's (endocrine pancreas). The exocrine pancreas of control group (figure 1) showed the normal histological structure which composed of acini lining by secretory pyramidal cells. The ductal system of the rabbit pancreas including centroacinar cells, intercalated ducts, and main ducts. These histological observations → similar to histological description of normal rabbit pancreas was recorded by (12). The first treated group of rabbit at dose 200 ppm of sodium fluoride/ daily administered with drinking water for period extended to six weeks, the histopathological changes revealed that the structure of the rabbit exocrine pancreas represented by disarrangement of pancreatic acini, degeneration in the most of the pyramidal secretory cells which lined the acini, and zymogenic granules was disappear from the number of the pyramidal cells. From other hand, the degeneration and mild necrosis was occurred in the simple cuboidal epithelium cells which lined the intercalated duct and intralobular duct (figure 2,3)→ these histopathological alteration may be led to the plasiological dysfunction of the enzymatic activity of the rabbit exocrine pancreas. These findings was identical with earlier experimental studies on the exocrine pancreas of rat was done by (6,7). They mentioned the effect of sodium fluoride in the anti oxidative enzymes activity when exposed to sodium fluoride in drinking water for experimental period (four) months, which led to hyperglycemia, they suggested these histopathological and biochemical changes due to damage of rat pancreas which exposed to effect of the fluoride ions. But other workers (13,14) they found, the level of insulin in the level of insulin in the blood was declined due to affect of sodium fluoride on the rats pancreas and led to increase in glucose level in the blood plasma. The most researches about effect of fluoride on the organs of the mammals and birds body especially male reproductive system in the rats was studied by (15) and the morphological effect of sodium fluoride on the spleen, liver, kidney and bone marrow was investigated by (16) in the mice, they reported, the histo – pathological changes were greater at the higher dose (50 mg) sodium fluoride /kg body weight. The results of present study in the second treated group was administered (300 ppm)/daily of sodium fluoride with drinking water for six month.
period, the exocrine pancreas of experimental rabbits was exposed to pathological alterations involving degenerative changes, severe necrosis in the acini of the exocrine pancreas (figure 4). From another hand, the enlargement of the intercalated duct and intralobular duct as well as some exocrine acini were atrophied, these observations was agreement with previous studies (6,7) in the rats exocrine pancreas they showed damage in exocrine portion and atrophy in acini.

Figure 1: acini Exocrine of rabbit pancreas. Consist of numerous secretory varied in the and shapes lined by pyramidal cells. Hematoxylin - Eosin stain. 250 X

Figure 2: Rabbit Exocrine pancreas of the first treated group with 200ppm sodium
fluoride daily with drinking water, the histo – pathological changes were included disarrangement of the acini and disappeared the zymogenic granules from apical cytoplasm in the acinar cells. Degenerative changes in the epithelial lining of ducts. Aldehydefucsin stain. 450X

Figure 3: Rabbit exocrine pancreas, in the first treated group (200) ppm of sodium fluoride With drinking water for six week period, show the moderate histo pathological Alterations in some acini represented by degenerative changes.
Figure 4: Rabbit exocrine pancreas, second treated group which exposed to (300 ppm) Sodium fluoride /daily for six weeks period, this figure revealed sever degeneration and necrosis of the acinar cells, led to lost of zymogenic granules as Well as enlargement of the intercalated duct and intralobular duct. Hematoxylin and Eosin. 450 X

Reference :


تأثير جرع مختلفة من فلوريد الصوديوم على البنكرياس الخارجي للألبان.دراسة نسيجية مرضية

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الخلاصة

اجريت الدراسة على (18) أرنبًا ذكرًا لتحديد تأثير فلوريد الصوديوم بتراكيز مختلفة في الترطيب النسجي للبنكرياس الخارجي للألبان. قسمت حيوانات التجربة عشوائيًا إلى ثلاث مجاميع، مجموعة السبتمبر وجميل المعايرة الأولى أجريت (300) جزء من المليون في المليمول من فلوريد الصوديوم بزيموًا في ماء الشرب، وجميل المعايرة الثانية وجميل المعايزة الثانية (300) جزء من المليون في المليمول من فلوريد الصوديوم بزيموًا في ماء الشرب خلال المدة التجريبية. تضمنت كل مجموعة ست أرانب من الذكور. حددت تغيرات نسجية - مرضية متوسطة في الجزء الخارجي لبنكرياس الأرانب، تمثلت بتغيرات اضمحلالية في الخلايا اللمبية للعناب مع فقدان الحبيبات
الخميرية (الزائموجينية) في بعض الخلايا العنبية، ولوحظت تغييرات نسجية. مرتبطة شديدة في تركيب الوحدات النسجية للبنكريس الخارجي لأراتب مجموعة المعاملة الثانية، تضمن اضمحلال وانتشار شديد في العنبات، ومن ناحية أخرى ضمور العنبات مع توسع في الفوائض البنية والفوائد داخل الفصوصات.