EFFFECTS OF ASPIRIN INTAKE ON HISTOLOGY OF BREAST IN RABBITS

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ABSTRACT

OBJECTIVE: To determine histological changes in my epithelial cells and ducts in breast tissue after oral administration of Aspirin.
STUDY DESIGN: Experimental Study
PLACE AND DURATION: The study was conducted at Islamic International Medical College, Rawalpindi, during 1st August 2011 - 31st October 2011.
METHODOLOGY: Twenty adult male rabbits were obtained from national institute of health. Ten rabbits were included in experimental group and 10 were used as their controls. The experimental group was given 500 mg Aspirin / 10 ml of water/day for 30 days through infant feeding tube. Day 0 was taken as day of stat of experiment. After 30 days rabbits were sacrificed and breast tissue was taken.
RESULTS: The number of myoepithelial cells was significantly more as compared to control group. The interlobular connective tissue around the ducts and alveoli was loosely arranged and cellular, whereas that surrounding the larger ducts and lobes (interlobular connective tissue) was variably dense and contained much adipose tissue.
CONCLUSION: Aspirin influences normal histology of breast and myoepithelial cells respond to oral intake of aspirin.
KEYWORDS: Aspirin, Histology, Breast, Myoepitheial Cells.

INTRODUCTION

Aspirin a derivative of salicylic acid has long been used to treat body aches and muscle aches[1]. Recently, studies have been done to show the effects of aspirin in the prevention of breast cancer[2]. The finding are consistent with earlier research indicating that the regular use of aspirin intake might reduce the risk of so-called estrogen receptor-positive breast cancer, which makes up about three quarters of breast cancer cases[3]. The researchers discovered that women who used aspirin at least four times a week for at least three months were almost thirty percent less likely to develop breast cancer than women who used no aspirin[4]. This led the researchers to suspect that aspirin reduced the risk of breast cancer by interfering with the body's production of estrogen[5]. For older postmenopausal women, the link with aspirin was strongest when taken seven or more tablets a week. The results provide evidence for the researchers' suspicion of aspirin blocking estrogen production since hormone-fueled breast cancer in more common in older women[6]. Aspirin indirectly lowers levels of estrogen in the breast by producing an enzyme called prostaglandins which induces an enzyme crucial to estrogen production[7]. Several theories have been offered to explain the protective effect of aspirin against the development of breast cancer in past studies. Researchers believed that aspirin may help prevent breast cancer by blocking the COX-2 enzyme, which otherwise could stimulate the growth of cancer cells[8].A number of researches have been conducted to observe effects of aspirin intake on histology of breast in diseased states like cancer but unfortunately, studies have not yet yielded enough information regarding changes in histological structure of normal breast tissue on intake of Aspirin[9]. So this study was conducted to see effects on histology of breast on intake of Aspirin. Whether aspirin has some effects on ductal branching pattern or on content of connective tissue which later on results in improvement of breast cancer was the main concern of study.

METHODOLOGY

Simple random sampling technique was used. This experimental study was conducted at Islamic International Medical College, Rawalpindi, during 1st August 2011 - 31st October 2011. Twenty male rabbits were obtained from national institute of health. Ten rabbits were included in experimental group and 10 were used as their controls. The experimental group was given 500 mg Aspirin / 10 ml of water/day for 30 days through infant feeding tube. Day 0 was taken as day of start of experiment. After 30 days rabbits were sacrificed and breast tissue was taken. The control group was also sacrificed. It was fixed in 10% Formalin and processed for making paraffin block. After processing for making paraffin blocks 10μm and 7 μm sections were cut from the same block and stained with H & E stain. The procedure was done also for control group.

The stained slides were observed for the following parameters:
1. Histological changes in shape of cells lining the ducts
2. Number of my epithelial cells/unit area
   The data was analyzed using SPSS version 10. The quantitative data was interpreted with the help of unpaired Student's' test. A p value of $p=0.05$ was taken as significant and p value of $p=.001$ was taken as highly significant.

RESULTS

In experimental group specimens obtained from eight rabbits

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out of ten showed no change in lining epithelium (Fig 1B). In the control group the main ducts were lined by the stratified epithelium (Fig 1A). In 20% of the slides, the lactiferous sinuses showed that the two-layered stratified cuboidal epithelium was reduced to one layer. In the control group branched my epithelial cells were found between epithelial cells and

basement membrane (Fig 1A). Number of myo epithelial cells was significantly more in the experimental group as compared to control group (Table –I). In experimental group 40% of the slides the ductless and alveoli were surrounded by the loosely arranged connective tissue and the larger ducts and lobes were surrounded by dense C.T. and had adipose cells (Table - II).

TABLE-I: NUMBER OF MYOEPITHELIAL CELLS IN CONTROL AND EXPERIMENTAL GROUP

NUMBER OF MYOEPITHELIAL CELLS/Unit Area	GROUP	P value
15.93±0.63 33.63±0.29	Control Experimental	<.001
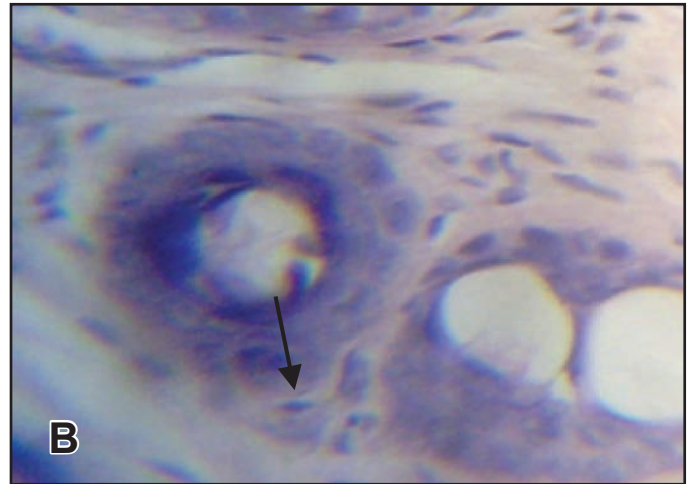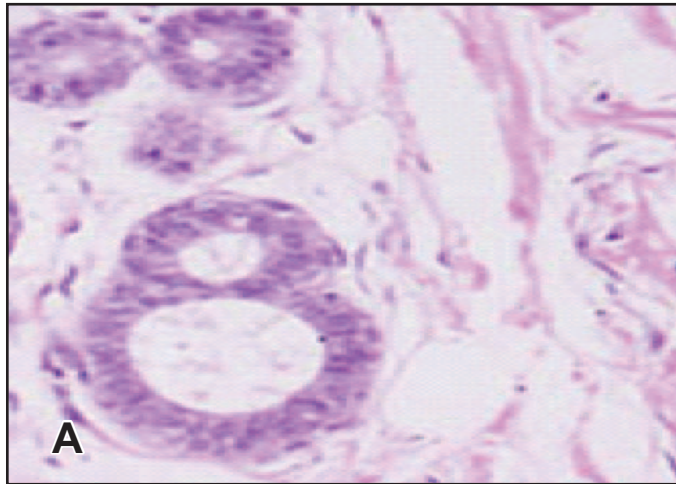
FIGURE-I: PHOTOMICROGRAPH OF RABBIT BREAST TISSUE. IN A CONTROL BREAST TISSUE IS SHOWN AND IN B EXPERIMENTAL BREAST TISSUE IS SHOWN. ARROW SHOWS MYOEPITHELIAL CELLS.

TABLE-II: HISTOLOGICAL CHANGES IN CONTROL AND EXPERIMENTAL GROUP

	Presence of Loose Connective Tissue	Presence of Adipose Cells	Changes In Lining Epithelium of Lactiferous Sinus
Control Group	60%	60%	None
Experimental Group	40%	40%	20%

DISCUSSION

In this study it was seen that aspirin intake affected the number of myoepithalial cells in breast tissue. Some of the other authors have shown that aspirin affects the normal histology of breast tissue[10]. Some studies have shown that patients with estrogen-dependent breast cancer have definitely shown improvement on intake of aspirin[11]. This study was done to show whether aspirins has some effects on normal breast histology. Loose connective tissue was present around the interlobular connective tissue and the ductless (Table-II). Recent studies have shown that mutations occur in stromal component which are independent of mutations in the neoplastic epithelium[12,13]. There was no change in lining epithelium of ducts and this is in accordance with previous findings. However it is yet not proved that it is just aspirin which controls the cancer or some other biological change which causes mutations[14]. However studies have shown that Aspirin may improve symptoms in cancer patients by bringing inflammatory changes[15-17]. Inflammatory

chemicals are produced in large quantities in breast cancers[18]. It has been proved that aspirin intake prevents breast tumor cells from invading and destroying other tissue[19]. COX-2 inhibitors have been shown to decrease aromatase activity in breast cancer cells which converts androgens to estrogens. In this study adipose tissue was found in increased amounts as compared to control group and it has been proved that adipose tissue contains aromatase which helps in controlling estrogen levels in postmenopausal women and helps in improving breast cancer prognosis. The histological changes in breast tissue in rabbits shown in this study can be used further to highlight role of Aspirin intake during and before development of breast cancer.

CONCLUSION

The intake of Aspirin does not significantly affect the normal histology of breast but increased number of myoepitheial and adipose cells can be a clue to better prognosis of breast cancer.

In order to have a clear understanding of effect of Aspirin intake the electron microscopic study is needed.

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