

## EFFECTS OF SMOKELESS TOBACCO ON STOMACH

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### ABSTRACT:

This study was designed to see the effects of smokeless tobacco on the stomach. 40 Rabbits were distributed into four groups. One group was used as control, while the rest three were given Nasswar, water extract of tobacco, Nasswar and water extract of tobacco respectively. The animals were sacrificed and the stomach were cut and examined for changes after fixing and staining. The morphological changes produced were mild, while the degenerative changes and inflammatory infiltration were observed in some animals. In our study we could not see any carcinogenic effect of tobacco in the stomach. Prolong clinical and experimental study should be carried out to determine the carcinogenic effect of Nasswar and tobacco.

### INTRODUCTION:

Man has used tobacco for about 1000 years<sup>1</sup>. Once introduced, its use has seldom been eliminated, even by religious or legal proscriptions<sup>2</sup>. Nasswar and Pan are two forms of smokeless tobacco used commonly in Pakistan, India and Bangla Desh. Whereas, Naswar is a common habit in Afghanistan and Russia<sup>3</sup>. Four main types of chewing tobacco in United States are loose leaf, plug, twist and fine cut<sup>4</sup>. Acute haemorrhagic gastritis<sup>5</sup> and chronic gastritis<sup>6</sup> are considered to be associated with tobacco use. Use of tobacco is also considered to be one of the causes of peptic ulcer<sup>6</sup>. We designed this experimental study to see the effects of smokeless tobacco i.e. Nasswar and water extract of tobacco on the stomach.

### MATERIALS & METHODS:

Forty Rabbits were used as experimental animals in this study. The rabbits were divided into four groups of ten each. Group B was given Nasswar. Water Extract of Tobacco was given to group 'C' whereas Nasswar as well as water extract of tobacco was given to group 'D'. Group A was control.

Nasswar was given in the form of water suspension with help of insulin syringes without needle. The dose was calculated by measuring Nasswar consumption in ten persons of different areas of NWFP and calculated as follows:

Dose of Nasswar in mg/kg = Nasswar used by 10 persons in mg/Total body wt of 10 persons in Kg.

Schedule of the above is given in Table 1.

Water extract of tobacco leaves was prepared by taking the measured amounts of tobacco used water for grinding it. After keeping it overnight and grinding it further, the supernatant fluid was introduced into buccal pouch of the animals with an insulin syringe without a needle. Nasswar and water extract of tobacco were given in 4-6 divided doses per day for a period of twenty six

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**Table I. Schedule of Dosage**

Group	No. of animals	Experiment	Dose/day			
			Day 1-3	Day 4-6	Day 7-9	Day 10 to end
A	10	Normal diet only	Normal Control			
B	10	Nasswar	150 mg	175 mg	200 mg	225 mg
C	10	Water extract of tobacco	3 ml	4 ml	5 ml	6 ml
D	10	Water extract of tobacco + Nasswar	2 ml + 100 mg	3 ml + 125 mg	4 ml + 200 mg	5 ml + 225 mg

weeks. The animals were fixed on the routine animal house diet consisting of jawi and channa. After the completion of the required period the animals were sacrificed; the stomachs were cut and examined for any gross change. The tissues were fixed in 10% formal saline, sections were made after manual processing and were stained by Haematoxylin and Eosin (H & E) and Periodic reagent schiff (P.A.S)

## RESULTS:

### Group A:

Microscopic examination of the stomach of the animals of this group showed intact architecture. The stomach was composed of mucosa, submucosa, muscular layer and serosa. The mucosa was made up of surface epithelium, lamina propria and muscularis mucosae. The surface epithelium consisted of tall columnar mucous secreting cells. On PAS staining these cells showed rose red colour. The mucosa showed gastric pits lined by cells similar to those of surface epithelium.

The lamina propria contained tubular glands separated by delicate connective tissue. The glands were lined by normal chief cells and parietal cells. The submucosa was composed of loose connective tissue containing a few blood vessels. The muscular coat was composed of smooth muscle fibres arranged in inner circular and outer longitudinal layers separated by delicate connective tissue. No abnormality was seen in any of the layers.

### Group B:

Stomach of seven animals (70%) of this group did not reveal any pathological change. One animal (33%) out of three with positive results showed epithelial hyperplasia. In stomach of another animal (33%) of this group, the surface lining showed some exfoliation, whereas in the third animal (33%) chronic gastritis was observed. In this way three animals (33%) revealed changes of varying degree and forms.

### Group C:

Stomach of eight animals (80%) were free of any pathological changes. In the rest (20%), only one stomach showed gastritis and the other mucosal hyperplasia.

### Group D:

No abnormality was detected in the microscopic examination of the sections of stomach of 4 animals of this group. Six animals showed mild changes. Four animals with positive findings showed degenerative changes whereas two revealed epithelial hyperplasia. Submucosal erosion was noticed in one animal of this group.

**Table 2. Analysis of the findings and severity of the lesions****(i) Duodenum**

Group	A	B	C	D
No. of animals affected	---	3	4	5
Degenerative changes	---	--	--	2 (+)
Hyperplasia	---	1 (+)	2 (+++)	1 (++)
Erosion	---	1 (+)	1 (++)	1 (++)
Inflammation	---	1 (+)	1 (+++)	1 (++)

**(ii) Jejunum**

Group	A	B	C	D
No. of animals affected	---	1	---	4
Sloughing	---	1 (+)	---	---
Necrosis	---	---	---	2 (+)
Inflammation	---	---	---	3 (++)

*Average severity of the lesion is within parenthesis.*

**DISCUSSION:**

Morphological changes produced in the stomach of experimental animals in our study were mild. However, degenerative changes and inflammatory infiltration were observed in some animals.

The change in the epithelial cells is brought about by the alkaline pH of the Nasswar. Results of Sharif's<sup>13</sup> observation can be explained in such a way that the alkaline pH of Nasswar utilises the gastric acid thus resulting into a hypoacidity. The result of the present experiment also supports Sharif's explanation because the effect of Nasswar were produced in oral mucosa, tongue and oesophagus where the alkaline pH was neutralised by the acidic pH of stomach contents, the effects obtained in the stomach are either mild or none. This decrease in gastric acidity can be considered beneficial in the beginning but later on continuous effect of Nasswar and tobacco extract will perhaps render the gastric mucosa of such patients loose protection against the development of tumours.

Looking at the result of different investigations, it is clear that changes due to the use of tobacco are produced only in a small number of cases, where the other remain free of changes. It is likely that environmental factors and personal habits may play a role in such individuals. Alcohol consumption alongwith tobacco is considered to increase these effects<sup>10</sup>. Tobacco smoking and use of smokeless tobacco are also found to have a synergistic action<sup>9</sup>. Certain diseases like diabetes, viral infection and deficiencies such as avitaminosis also have their effect on these changes<sup>11</sup>.

Prolong clinical and experimental studies should be carried out to determine the carcinogenic effect of Nasswar and tobacco extract, if any.

In our study we could not see any carcinogenic effect of tobacco in the stomach. It might just be due to shorter duration of study.

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