Preface

In the evolution of medicine, a remarkable feature is the progressive influence of experimental sciences, in particular biochemistry and molecular biology. Function and malfunction of the organism are for an important part determined by biochemical phenomenas.

Gastroenterology has experienced an enormous growth during the past several decades with an explosion of technological advancement in the areas of research. The pioneers who contributed in the progress of gastroenterology had offered effective methods of combating disease and promoting health.

The use of furosemide in chronic congestive heart failure and hypertension has already been well established. The activities of furosemide in relation to gastric acid have been accumulated and the present investigation emphasizes on the basic and fundamental searches in detail regarding the effect of the furosemide in peptic ulcer syndrome with the plausible mechanism involved.

The search for a potent antiulcerogenic agent is on for a long time that can solve all the inevitable problems of the disorder without compromising the efficacy and safety. We have tried earnestly to contribute in this line by providing a comprehensive account of valuable perspectives on the role of furosemide in peptic ulcer disorders.
Throughout the investigation, greater care has been taken to maintain the fundamental aims of the study to present the scientific basis of peptic ulcer syndrome in such a fashion that it will provide insight into the advancement of researches and the common clinical problem.

Systematic scientific investigation has not been done so far to evaluate the antiulcerogenic property of furosemide which prompted the investigator to take up the study on furosemide and peptic ulcer.

The text has been divided into five chapters all arranged in logical sequence. The first chapter i.e. review of literature defines the peptic ulcer, factors associated with it, mechanism of acid secretion, mucosal defense and ulcer healing and history of furosemide. This short review of literature gives the thoughts and rationale that laid the foundation to the subject which provide the current applications and future directions of peptic ulcer management technology with furosemide.

The next chapter deals with the aims and objectives of this investigation and the designing of experimental research works, which is followed by a brief description of materials and methods used for this investigation in the third chapter.

Results have been interpreted in the fourth chapter. The emphasis is given on experimental and clinical study with a full description of the presentation, investigation and treatment of the peptic ulcer with furosemide. We have attempted to interpret these experimental and clinical aspects by reference to the underlying mechanism whenever
possible. The explanation with the plausible mechanism of the results of the investigation with a discussion is delineated in the fifth and final chapter.

The discussion part is not only the theory and practical uses of these procedures but also the contra-indications and potential complications, the evaluation and assessment of the result obtained, and the future direction of the modality. All the references have been recorded serially maintaining the definite order.

To study the cytoprotective and therapeutic actions of furosemide experimental ulceration has been extensively studied using a wide variety of models to develop the role of furosemide in mucosal defense mechanisms.

Indomethacin and other non steroidal antiinflammatory drug (NSAID) are associated with serious gastroduodenal mucosal injury. Absolute ethanol, a necrotising agent is associated with acute gastric mucosal lesions characterized by mucosal hemorrhages and erosions. Furosemide pretreatment effectively resists the induced lesions caused by indomethacin and alcohol and appears to be a potent gastric cytoprotective agent.

Gastric secretory study represents a lot of information about the effect of furosemide on different constituents present in gastric acid and gastric mucosa and thus explain the mode of action of furosemide.
Histological study of gastric mucosal tissue explains the healing process in presence of furosemide. Mucosal restitution and epithelial integrity and continuity of gastric mucosa is found to be reestablished with an accelerated rate due to furosemide treatments.

Histamine is the main stimulator of gastric acid secretion. From the biochemical analysis of histamine content in gastric mucosa (mainly in fundic region) and also the histopathological findings support the fact that furosemide prevent the release of histamine from the mast and chief cell.

The role of free radicals (reactive oxygen) in ulcer formation is now well established, so the role of furosemide in this context was examined to give an illuminating insight in the management of peptic ulcer syndrome by furosemide.

Gastric antisecretory effect of furosemide may well be assessed using chambered frog gastric mucosa, a unique and classical method of measuring gastric H⁺ ion transport. The role of furosemide on Na⁺/K⁺ exchange, K⁺-flux may also provide the information leading to the cessation of gastric acid secretion in a controlled way.

The Mg²⁺ dependent H⁺ transporting, K⁺ stimulated adenosine triphosphatase in the gastric parietal cell is the terminal step of acid secretion. In vitro study with the microsomal vesicle containing H⁺, K⁺-ATPase enzyme reveal that furosemide inhibit the activity of H⁺, K⁺-ATPase upto 50%.
Scanning Electron Micrographs also reveal that furosemide being an anionic agent has got an effect on the surface of gastric mucosal cell or parietal cell which suggest some mechanism for furosemide inhibited $\text{H}^+\text{K}^+\text{-ATPase}$ related acid secretion.

All these findings suggest that furosemide plays a vital role in the treatment of peptic ulcer syndrome. Besides inhibiting $\text{H}^+\text{K}^+\text{-ATPase}$ activity, furosemide also regulate acid secretion by preventing histamine release and makes mucosal defense system strong, increases free arachidonic acid (precursor of prostaglandin) release. This also emphasizes the requirement of extensive research to use it as an alternate drug with absolute potency by adding a new dimension to the treatment of peptic ulcer syndrome.

The whole investigation concentrate on the aspects of peptic ulcer related to furosemide and it successfully fulfill our objectives. It also significantly contribute in the field of peptic ulcer treatment.

In addition to being comprehensive it is also updated. Present investigation give certain interesting results which needs to be study in detail.