



Biochemistry

Third Stage <

GASTRIC FUNCTION TEST



Introduction

In diseases of the stomach and duodenum alterations of gastric secretion often occur.

Chemical examination of gastric contents has a limited but specific value in the diagnosis and assessment of disorders of the upper gastrointestinal tract..

Gastric juice is a clear, pale yellow, odorless fluid with a strong acidic pH (around 1) and a specific gravity of approximately 1.007.

Composition of gastric juice

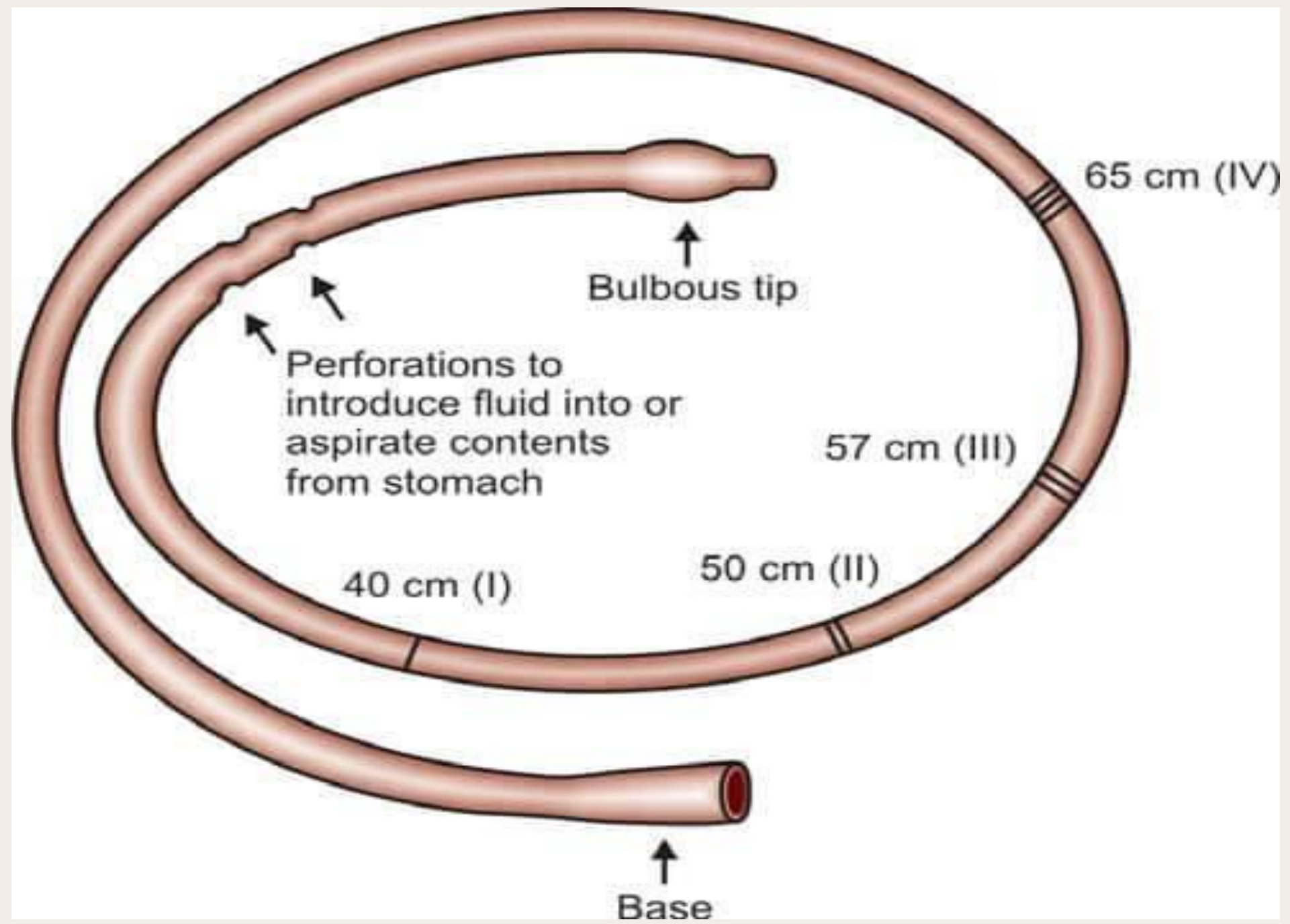
- Pepsinogen secreted by chief cells
- Hydrochloric acid secreted by parietal cells
- Rennin
- Haemopoietic factor
- Mucus secreted by mucous cells
- Organic acids
- Water 98-99%

Functions of Gastric juice

- Water liquefies the food swallowed
- HCL
 - Acidifies the food and stop the action of salivary amylase
 - Kills ingested microbes
 - Provides the acidic environment required for action of salivary amylase
- Digestive enzymes (Rennin, Pepsin & lipase) act on food
- Intrinsic factor helps in absorption of Vit B12

Ryle's tube

- It is a long thin rubber tube having 4 mm diameter.
- There is a lead piece at the tip of tube
- There are a no. of perforations at a short distance away from the tip
- •When the first mark (single line) is at the level of incisor teeth, the tip has reached the cardiac end of oesophagus.
- When the second mark (double line) is at the level of incisor teeth, the tip has reached the pyloric region of stomach.
- When the third mark (triple line) is at the level of incisor teeth, the tip has reached the duodenum.
- Ryle's tube is passed into the stomach, and gastric juice is collected periodically before and after stimulation by administering a test meal.



Stimulants used:

- Histamine: A large dose of histamine is given to obtain maximum gastric secretion.
- Betazol (3-beta-amino ethyl pyrrazole): this is a synthetic analogue of histamine
- Pentagastrin: Most preferred stimulant. It is very potent with very few side effects.

Effective in low dose.

Physical examination

Volume: 30-60 ml

Appearance: clear and watery liquid

Color: pale yellow (normal)

- **Brownish red** (presence of excess blood)
- **yellow** (presence of fresh bile)
- **Greenish** (presence of old bile)
- **Red** (presence of small amount of blood)

Odor: odorless (normal)

typical odor in case of presence of pathological constituents.

Chemical examination

- **Test for Chloride**
- **Gunzberg's test for HCl**
- **Ufflemann's test for presence of lactic acid**
- **Iodine test for starch**
- **Benzidine test for blood**
- **Test for pepsin**

Preparation of the patient

- The patient will take light evening meal and fast for 12 hours overnight and also on the next morning till the test is completed.
- Introduction of the tube.
- On the next morning, the patient is asked to swallow the bulbous end of the Ryle tube into the throat and the process of swallowing will be continued till the third marking reaches the teeth.

Aspiration of gastric juice

- The fasting contents will be completely withdrawn by means of syringe, measured and kept for analysis.

This is total resting juice.

- The patient is now administered 50-80 cc liquid meal (7% alcohol) into the stomach with the help of a syringe.

Aspiration of gastric juice

- 10-15 ml of gastric juice is aspirated at every 15 minutes up to 2:30 hours (10 samples).
- Each aspirated fasting sample along with 10 samples after the test meal are tested separately.
- Physical examination
- Amount: Resting juice 15-50ml. Increase resting juice indicates pyloric stenosis, peptic ulcer or gastric malignancy.

Examination of resting contents

Volume:

In most normal cases after a night's fast only 20 to 50 ml of resting contents is obtained. Volume greater than 100 to 120 ml is considered abnormal.

Consistency:

The normal resting gastric juice is fluid in consistency and does not contain food residues. It may contain small amounts of mucus. Food residues are present in carcinoma of the stomach.

Colour

In more than 50 per cent of normal individuals, the gastric residuum is clear or colourless, or it may be slightly yellow or greenish due to regurgitation of bile from duodenum.

Gastric juice analysis: Quantitative

❑ Determination of free & total acidity

- Free acidity- Acidity due to HCl acid
- Combined acidity- acidity due to organic acids like lactic acid, citric acid, butyric acid, other fatty acids
- Total acidity = Free acidity + Combined acidity

❑ Determination of total chlorides

- Estimation of free and total acidity may give false impression of hypochlorhydria or achlorhydria.
- However, the total chloride content of gastric juice remains unaffected.
- Total chloride is estimated by titration of gastric juice with silver nitrate (0.1 N), in presence of nitric acid using 0.1 N ammonium thiocyanate and ferric ammonium sulphate.



THANK YOU