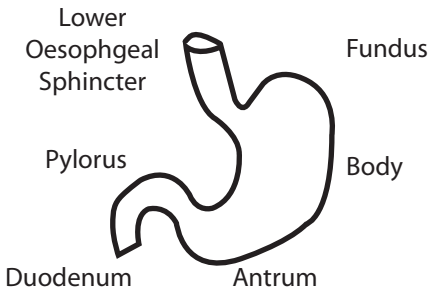
JULY 2007
QUESTION 10

Describe the control of gastric emptying

The stomach is a muscular hollow viscous with three major functions

- storage of food
- mixing and digestion of food
- emptying of food

Gastric anatomy



The main effector of gastric emptying is the neuromuscular system

Neuro

- Sympathetic input via coeliac plexus decreases gastric emptying
- PNS via the vagal nerve increases gastric emptying
- Intrinsic nervous system via the meissner (submucosal) and auerbach (myenteric)

Muscular

- 3 layers, oblique, longitudinal and circular layers
- under control of the intrinsic nervous system generates peristaltic motions , incl MMC
- antral/pyloric pump is the key to controlling the rate of emptying

The rate of emptying is dependent on the pressure gradient (developed by the antral pump) between the antrum and the pyloric resistance

Factors which determine the effector response are physicochemical/mechanical and hormonal

Mechanical

- Liquids empty much faster than solids (exponential fashion)
- Gastric distension increases emptying (vagal mediation)
- Duodenal distension decreases emptying (hormonal mediation)
- Osmolality (quickest emptying is isotonic, extremes are delayed)

Hormonal (most important factor in overal gastric emptying)

- Balance between the pro emptying gastric hormones and the inhibitory duodenum hormones
- Protien in the stomach causes gastrin release which increases emptying
- Fats (slowest) stimulates the potent CCK which inhibits emptying
- CHO (fastest) stimulates the weak gastric inhibitory peptide (GIP) which inhibits emptying
- Acid in duodenum stimulates secretin release - direct inhibitory effect on gastric smooth muscle