A Review On-Floating Drug Delivery Systems

[1]PRAGATI S. PADOLE, [2]SWAPNIL G. KALE, [3]KOMAL B. MATE, [4]DIVYA D. JARE, [5]DR. YOGESH BAFANA

[1,3,4]STUDENT, [2]ASST. PROFESSOR, [5]PRINCIPAL
Arihant College of Pharmacy, Ahmednagar.

***Abstract*- The need of writing the review on floating medicine delivery system (FDDS) was to study numerous Scientific & technological advancements made in the exploration. Development of colorful medicine Delivery. Systems Oral, controlled release systems are programmed to deliver medicine in particular time frame that will increase the bioavailability & efficacy of medicines. The development in FDDS including physiological & variable affects gastric retention this review also summarizes the in vitro ways in vivo studies to estimate the operations of floating systems. It includes the physiology factors controlling gastric retention time excipient impacting gastric retention. The main approach is to design single unit &multi-unit floating structure colorful aspects like bracket, Formulation & evaluation of operations of these systems are bandied This review composition is in pursuit of giving detailed Info on their design bracket advantages & unborn eventuality of FDDS.**

***Keywords*- Floating Drug Delivery Systems, Gastric hearthstone time, Single unit, Multiple unit**

Introduction

The Solid oral lozenge forms similar as tablets, capsules give specific medicine attention in blood without getting any rotation control over medicine delivery system. To achieve bettered remedial advantages of oral controlled medicine delivery system has been adding interest in drugstore field. The medicines are fluently excreted from the systemic rotation & are fluently absorbed from gastrointestinal tract (GIT). The medicine immersion from GIT is a complex procedure.

Gastro protective Systems can remain in the gastric region for several hours & prolongs the gastric hearthstone time of medicines. This improves bioavailability solubility and reduces medicine waste for to get maximum gastric retention of Solid lozenge forms is followed by the medium. Of important adhesion, Sedimentation, Floatation that delay gastric evacuating. The bracket of floating medicine delivery systems has been described in detail. Several recent exemplifications have been reported showing the efficacy of similar systems for medicines with bioavailability problem.

Introductory Gastrointestinal Tract Physiology-

The Stomach is divided into 3 regions fundus, body & Antrum. The proximal part is acting Fundus & body and the antrum acts pump for gastric evacuating Gastric evacuating occurs during fasting. During dieting inter digestive series of event take place. This is known as inter digestive myoelectric cycle. Which is divided into 4 phases.

Phase I In this phase gastric evacuating rate is slow as onset of MMC is delayed. It generally lasts for 30 to 60 min. It also knowns as rudimentary phase

Phase 2 lasts for 40 to 60 min. As the phase progresses the intensity & frequency increases. In this phase corrosiveness stashing & mucous discharge take place for short time. It's also known as pre burst phase

Phase 3 Last for 10- 20 min in this phase regular & violent compression take place. It's due to this surge that all undigested material is swept out of stomach.

Phase 4 lasts for 6 to 5 min & occurs between phases III and 1 of 2 successive cycles. This is also known as digestive motility pattern & comprises nonstop compression

Factors Affecting Gastric Retention-

1. viscosity- GRT may be operated of indicator finite volume kind buoyancy that is obsessed with viscosity.
2. The rate of gastric retention substantially depends on the density volume & Calorie content of reflections. Nutritional viscosity of refection's helps determine gastric evacuating time.
3. Single or multiple unit expression-Multiple unit expression shows a lot of inequitable unharness.
4. Calories happy- GRT is exaggerated by four to ten hours with a mess that is high in protein of fats.
5. Gender- Mean mobile GRT in joker is lower quantum (3.4 ±0.6 hr.) compared with age matched womanlike counterpart (4.6 ±1.2 hr.).
6. Biological factors- Polygenic diseases, stress colorful conditioned.
7. Size & shape of lozenge unit also affect gastric evacuating. The periphery of lozenge unit is also inversely important as an expression parameter.

8. Several expression parameters can affect the gastric hearthstone time" AS a unit of multi articulate systems are distributed freely through GIT. Their transport is affected by transmit.

Classification of Floating Drug Delivery System

Floating Drug Delivery System are classified depending on use of 2 formulation

1. Effervescent
2. Non effervescent

Effervescent: -

Effervescent systems include use of gas generating agents, carbonates &organic acids within formulation to supply Co2 gas. These are matrix type of systems prepared with the help with of swellable polymers such as methyl cellulose & various effervescent compounds. A new multiple type of floating dosage system composed of effervescent layers & Swellable membrane layers

1. Gas generating systems: -

These are formulated by mixing Co2. Generating agents & drug within matrix tablet. They have bulk density lower than the gastric fluids so remains floating in stomach.

2. Volatile liquid vacuum containing: -

This system is created to float within the abdomen to floatation chamber which can be vacuum

Non-Effervescent System: -

Non effervescent floating dosage form use a gel forming or swellable type of hydrocolloids. The formulation method is a simple of mixing drug & the gel forming hydrocolloid. After administration this with dosage form swells in contact with gastric Fluids. The foremost normally used excipient is non effervescent floating drug delivery system area gel forming

1. Colloidal gel barrier system- This system prolong gastric retention time & maximizes the amount of drug reaches sites of absorption. It contains drug with gel forming hydrocolloid. The system hydrates to generate a Colloid gel barrier to its surrounding.
2. Microporous comportment system - This incorporates the encapsulation technique of a drug reservoir inside a microporous comportment along with pores at top & bottom walls

Advantages of FDDS: -

1. Floating dosage form such as tablet capsule will remain in solution for prolonged time
2. FDDS are advantages for drugs used for local action in stomach
3. Drugs with considerably short half-life. Can be administered in this to get better activity
4. The FDDS are advantages for drugs. Absorbed through stomach.
5. FDDS retains the dosage form at the site of absorption & enhance the bioavailability
6. The problem of short gastric resistance time with Oral formulation can be over- come
7. FDDS enhances the bioavailability of dosage forms.
8. It is a targeted therapy for local ailments in upper GIT.

Disadvantages: -

1. The dosage form should be administered. With a full glass of water.
2. The drugs which irritates to gastric mucosa are not suitable
3. Drugs with Stability irritation & solubility problem in GIT are not suitable
4. The unstable drugs in acidic condition Of Stomach can't be used.
5. The drugs like Nifedipine which undergoes first pass metabolism are not useful
6. This system requires a high level of fluid in Stomach for drug to float
7. Drugs which are having irritant effect are not useful for FDDS
8. The drugs are primarily absorbed From Stomach & upper part of GIT

Application of FDDS: -

FODS enhances several applications for drugs having poor bioavailability because the narrow absorption window in upper part of GIT retains the dosage form at site of absorption &enhances bioavailability of drugs

They are summarized as

1. Sustained Drug Delivery: -

HBS Systems can remain in stomach for long periods hence they can release the drug over the prolonged period of time. So, the problem of Short gastric residence time of Oral formulation can be overcome. These systems have System are comparatively giant in size & spending from opening gap is prohibited.

Ex- Sustained released floating capsules of nicardipine were developed & evaluated in vivo.

2. Site Specific Drug Delivery-

These are having advantageous for drugs that are absorbed specially From Stomach

Ex: - Diuretic drugs are primarily absorbed from abdomen

Furosemide is primarily absorbed from the stomach followed by duodenum. A bilayer floating capsule was developed for Local delivery of misoprostol.

3. **Absorption Enhancement**

The drugs having low bioavailability because of site specific absorption from upper GIT are used to be formulated as floating drug delivery Systems by increasing absorption.

A significant increase in the bioavailability of Floating dosage forms can be achieved as compared to commercially available tablet.

Evaluation of FDDS: -

i. Determine Of Floating Time.

The drugs basically float because of carbonate which is present in the Formulation becomes soluble in acidic medium

ii. PH Measurement.

The pH was measured in solution of Na alginate using digital pH meter

iii. Drug Release -

The test for in vitro drug release is studied in gastric & intestinal fluids.

The tests are performed using USP dissolution apparatus.

The Samples are withdrawn periodically from dissolution medium replaced with same fresh medium & then analysed

iv. Physical Appearance -

All the prepared in place gel was check for clarity & also the time required for gel formation & type of gel formed.

v. Measurement Of Water Uptake:

The water uptake by the gel of formulation of metal alginate were determined by straight forward methodology. It can be studied by considering swelling behaviour of floating dosage forms. The testing is done by immersing form in gastric fluid and determine the changes like tablet diameter, thickness etc.

vi. Specific Gravity-

Displacement method is used to defer- mine specific gravity of FODS

Drugs Used in Formulations: -

1) Floating Capsule - Madopar, vatrelease, Cytotec, Diazepam 37
2) Floating liquid - Topalkan, Liquid Gaviscon
3) Floating Granules-Diclofenac Sodium, Prednisolone.
4) Floating Tablets - Ampicillin, Aspirin, fluorouracil

Conclusion: -

The FDDS enhances the drug absorption in the GIT. The drug absorption in gastrointestinal tract is a highly variable procedure & prolonging gastric retention of the dosage form extends time for drug absorption. The FDDS was set up in an exertion gastric maintenance time of measurements Structure and to control discharge.

Medication-based disease treatment is entering a replacement era during which a increasing range of innovative drug delivery technologies are getting used and are available for clinical use. Floating Drug Delivery Systems (FDDS) is one of the gastro-retentive dosage forms used to achieve extended duration of gastric residency. The main aim of writing this review on floating drug delivery systems (FDDS) was to compile the recent literature with particular specialize in the most floating mechanism to realize gastric retention. Sustained oral release of gastrointestinal dosage types provides many benefits for drugs with absorption from the upper sections of the alimentary canal and people that function locally throughout the stomach. This review includes the physiology, factors controlling gastric retention time, excipient variables influencing gastric retention, approaches to designing single-unit, hydro-dynamically balanced system and multi-unit floating structure, and aspects of their classification, formulation and evaluation are discussed intimately, and few applications of those systems

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REFERENCES:

1. Vijay Sharma Rathore, DS &Amit Kumar floating drug delivery system. A review international journal of Medical Biomedical studies. (IJMBS) 2020; 4(8) 23- 30.
2. Patel GM (2007) Floating drug delivery System An innovative approach to prolong gastric retention. www.pharmainfo net
3. Shweta Arora (2005) "Floating Drug Delivery Systems A review" AAPS Pharma Sci Tech 6(3) 372-390.
4. Patel R (2007) recent development in floating Drug Delivery system for gastric retention of drugs an overview http:// www. Swatijainist. Com/techno/Feb. 2007 // roma rtf
5. Sanjay Garg & Shringi Sharma (2003). "Gastro retention drug delivery system" Pharmatech 160-166.
6. Majethiya KA and Patel MR. Review on: Gastro retentive Drug Delivery System. International Journal of Universal Pharmacy and Bio Sciences. 2010;2(1):103-120.
7. Jayswal BD, Yadav VT, Patel KN, Patel BA and Patel PA. Formulation and Evaluation of Floating In Situ Gel Based Gastro Retentive Drug Delivery of Cimetidine. International Journal for Pharmaceutical Research Scholars (IJPRS). 2012;1(2):327-337.
8. Burns S, Attwood D and Barnwell SG. Assessment of a dissolution vessel designed for use with floating and erodible dosage forms. Int J Pharm. 1998;160:213-8.
9. Joseph N, Laxmi S and Jayakrishnan A. A floating type oral dosage form for piroxicam based on hollow microspheres: in vitro and in vivo evaluation in rabbits. J Controlled Release 2002;79:71-9.
10. Singh Amit Kumar and Arora Vandana. Formulation and In vitro Evaluation of Glipizide as Floating Drug Delivery system with Natural Polymer (Gur –Gum). Journal of Pharmaceutical and Scientific Innovation. 2012;1:24- 28