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PHARMACIST APPROACHES ON MEDICATIONS WHICH SHOULD NOT BE CRUSHED – A REVIEW

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ABSTRACT

As oral medications are the most preferred route of administration for various physical alignments and there are lots of modified release medications which are formulated for extended release or delayed release of medications, it's a pharmacist role to circulate the information how to use, things which should not be done when the modified release medications are prescribed. As these medications have to be handled with proper care to ensure therapeutic safety and better patient compliance, proper awareness and education has to be focused on the areas of patient counseling while these medications are dispensed.

KEYWORDS: Modified release, Delayed release, Patient compliance, Tablets, Crushed.

INTRODUCTION

Oral drug delivery has been successfully used for decades as the most extensively used route of administration among all the routes for the systemic delivery of drugs. Modified release formulations are dosage forms which delivers a drug with delay after administration. The prolonged effect of the dosage form works in contrast with immediate release dosage form, maintaining levels of active drug within the therapeutic window to avoid precarious effects of the drug.

The pattern of drug release from modified-release (MR) dosage forms is intentionally modified from that of a conventional or immediate-release dosage formulation to achieve a preferred therapeutic index or better patient compliance. Types of MR drug products include

delayed release (eg, enteric coated), extended release (ER), and orally disintegrating tablets (ODT).

Modified-release formulations technologies propose an operative means to augment the bioavailability and blood concentration-time profiles of drugs that otherwise suffer from such limitations offered by a limited release dosage form. The term "modified release" denotes to both delayed- and extended-release systems for oral administration as well as oral delivery systems intended unambiguously to modify the release of poorly water-soluble drugs.

Modified release dosage forms are defined by the USP as those whose drug release characteristics of time course and/or location to accomplish therapeutic or conventional objectives not offered by conventional forms, whereas an extended release dosage form allows a twofold reduction in dosing frequency or increase in patient compliance or therapeutic performance. It is remarkable to note that the USP considers that the term controlled release, prolonged release and sustain release are interchangeable with extended release formulations or drug delivery systems.

Types of Modified Release Formulations

The tablets and capsules with the following words/letters in their names should never be crushed, opened, chewed or sucked.

Word/letter	Type of product	Reason
CR/Chrono	Controlled Release	Disruption may lead to decrease the desired therapeutic effect of the drug
CRT		
EC/EN	Enteric Coated	
LA	Long Acting	
MR/Retard	Modified Release	
SA	Sustained Action	
SR/Dur/Dural	Sustained Release	
XL	Extended Release	

Terminology of Modified Release Medications

1. Modified release drugs: (LA, SA, CR, XL or SR)

These drugs are designed to be released over prolonged period, crushing of the medicines will slower the rate of absorption, resulting in toxicity or an overdose as the systemic drug concentration is too high, followed by period where the drug concentration is too low to be therapeutically active.

2. Enteric coated medicines (EN, EC)

These drugs were designed not to be released in the stomach, if crushed results in stomach irritation or damage, reduced potency of the drug due to acid degradation of the active ingredient, or release of the drug at the wrong site of action.

3. Film or sugar coated medicines

Crushing of these tablets can result in rapid degradation of the active ingredient, poor taste which may be difficult to swallow, can also cause skin irritation in patients.

Advantages of Modified Release Medications

- Improved control over the maintenance of therapeutic plasma drug concentration of drugs which are formulated as modified release medications.
- Improved patient compliance, resulting from the reduction in the number and frequency of doses required to maintain the desired therapeutic response, e.g. one per-oral modified release products every 12 hours contributes to the improved control of therapeutic drug concentration achieved with such products.
- Reduction in overall health care costs : although initial cost of extended release dosage forms may be greater than for conventional forms, overall cost of treatment may be greater cause of
- Enhanced therapeutic benefits,
- Reduced side effects
- We can avoid poly pharmacy, which is important tool for rational use of drug
- Enhanced of activity duration for short half-life drugs.
- Improved bioavailability of some drugs.
- Minimize drug accumulation with chronic dosing.

Medications Which Should Not Be Crushed

The listed below drugs are few common examples of tablets and capsules where advice on crushing or opening should be sought and an alternative formulation, such as a liquid medicine, should be used.

S. No.	Drugs	Brand name	Indication	category
1	Adalat CC	Nifedipin	Hypertension	Calcium channel blockers
2	Adderall XR	Amphetamine and dextroamphetamine	Nacrolepsy	CNS stimulants
3	Aggrenox	Aspirin and dipyridamole	Ischemic Stroke	Antiplatelet Agents
4	Allegra D 12/24	Fexofenadine / pseudoephedrine	Nasal decongestion	Antihistamine drugs
5	Altoprev 20/60	Lovastatin	Hyperlipidemia	HMG CoA reductase inhibitors
6	Avinza	Morphine	Clock round Pain	Opoid analgesic
7	Biaxin XL	Clarithromycin	H.Pylori Infections	Macrolide antibiotics
8	Bupropion SR	Bupropion hydrochloride	Seasonal depression disorder	Anti-depressants
9	Carbidopa/Levodopa ER	Carbidopa / levodopa	Parkinsons disease	Antiparkinsonism drugs
10	Concerta ER	Methylphenidate	ADHD	CNS stimulant
11	Darifenacin	Darifenacin	Over active bladder	Antispasmodics
12	Depakote ER	Divalproex	Seizures, Bipolar disorder	CNS stimulant

*LA represents Long acting drugs, *XL and XR represents Extended release drugs,

*SR represents Sustained release drugs.

Pharmacist Approaches on Modified Release Medications

As the area revolves around patient safety and drug efficacy, the pharmacist have to throw light on the patient counseling point, explaining about the need of modified release and its efficacy over immediate release medications. As disruption of these formulations can lead to accumulation of drug in plasma level and fluctuates therapeutic level of the medication.

CONCLUSION

Conventional dosage forms are used for management of acute and chronic health alignments from the earlier times of medical history. The major drawback of Conventional dosage form are: Poor patient compliance, increased chances of missing the dose of a drug with short half-life for which frequent administration is necessary, the unavoidable fluctuations of drug concentration may lead to under medication or over medication, Poly pharmacy especially in case of Geriatric patients. And maintaining rationale in dispensing dosage forms was very tough. Thus Modified release formulations came into existence and prove its remarkable use and advantage over conventional dosage forms. But its high time for a pharmacist to explain

about the modified release and the efficacy of the tablets will be loosed if the tablets were crushed, so the modified release dosage forms should be swallowed for its therapeutic efficacy and safety.

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