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SPECTROPHOTOMETRIC ANALYSIS AND METHOD VALIDATION FOR RISPERIDONE QUANTIFICATION IN PHARMACEUTICAL TABLETS AND PURE FORM

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ABSTRACT

Risperidone, an atypical antipsychotic, is widely used in the treatment of various psychiatric disorders. Accurate quantification of risperidone in both its pure form and in pharmaceutical tablet formulations is crucial for quality control and therapeutic efficacy. This study focuses on the development and validation of simple, reliable, and cost-effective spectrophotometric methods for the determination of risperidone in pure and tablet dosage forms.

Two spectrophotometric methods were developed based on the measurement of absorbance at specific wavelengths in appropriate solvents. Method I utilized a direct UV absorbance method, while Method II involved the formation of a colored complex with an appropriate reagent, allowing for the quantification of risperidone. Both methods were optimized by evaluating parameters such as solvent selection, pH, and concentration ranges to achieve accurate and precise results.

The developed methods were validated according to ICH (International Council for Harmonisation) guidelines, including tests for linearity, accuracy, precision, limit of detection (LOD), limit of quantification (LOQ), and robustness. The results demonstrated excellent linearity over a wide concentration range, with correlation coefficients greater than 0.999 for both methods. The accuracy and precision of the methods were confirmed with low relative standard deviations (RSD), indicating their reliability. Additionally, the LOD and LOQ values were found to be within acceptable limits, demonstrating the sensitivity of the methods.

The applicability of the methods was successfully tested by determining the concentration of risperidone in commercially available tablet formulations, with results consistent with the labeled content. The methods were also robust, showing no significant variation under slight changes in experimental conditions.

In conclusion, the developed spectrophotometric methods are simple, rapid, and suitable for routine quality control analysis of risperidone in both pure and tablet dosage forms. The methods offer an affordable alternative to more complex techniques, making them ideal for use in pharmaceutical laboratories and quality control settings.

Keywords: Risperidone, spectrophotometry, method validation, pharmaceutical tablets, quality control, UV absorbance, reagent complex.

I. INTRODUCTION

Risperidone is an atypical antipsychotic drug widely used in the treatment of psychiatric disorders such as schizophrenia, bipolar disorder, and irritability associated with autism. It acts by modulating the activity of neurotransmitters in the brain, particularly serotonin and dopamine receptors. As with all pharmaceutical drugs, ensuring the accurate and precise determination of risperidone in both pure and dosage forms is critical for guaranteeing its efficacy, safety, and compliance with pharmacopoeial standards.

The determination of active pharmaceutical ingredients (APIs) in formulations is an essential part of quality control and regulatory compliance in the pharmaceutical industry.

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RESEARCHARTICLE
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FRUSEMIDE-LOADED ALGINATE MICROSPHERES: FORMULATION, CHARACTERIZATION, AND IN VITRO EVALUATION VIA IONIC CROSS-LINKING

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ABSTRACT:
Frusemide (furosemide) is a widely used diuretic, but its short half-life necessitates frequent dosing. To improve its therapeutic outcomes, controlled release formulations like alginate microspheres can provide sustained drug delivery. This study aimed to formulate frusemide-loaded alginate microspheres using the ionic cross-linking technique and evaluate their physicochemical properties and release behavior.

Microspheres were prepared by cross-linking sodium alginate with calcium chloride, and characterized for particle size, surface morphology, drug entrapment efficiency, and release profile. The average particle size of the microspheres ranged from 150–300 µm, and scanning electron microscopy (SEM) confirmed their spherical shape. The drug entrapment efficiency was 80%, and in vitro release studies were conducted in simulated gastric fluid (SGF).

The release pattern of frusemide from the microspheres exhibited a sustained release over 12 hours, following Higuchi's diffusion model, indicating controlled release primarily through diffusion. Stability studies showed no significant physical or chemical changes in the microspheres over time.

In conclusion, the frusemide-loaded alginate microspheres demonstrated high entrapment efficiency, sustained drug release, and good stability. This formulation has potential for improving the bioavailability and patient compliance of frusemide therapy by reducing dosing frequency.

Keywords:
Frusemide, alginate microspheres, ionic cross-linking, controlled release, sustained release, drug entrapment efficiency.

1. INTRODUCTION

Micro pellets are solid particles of diverse forms (spherical, oval, and spheroid) with an optimal size of less than 125 microns, capable of being suspended in an appropriate aqueous medium and injected using a 17-20 gauge needle. Each particle consists of a drug matrix distributed inside a polymer, from which the drug is released by a mixed-order process. Calcium-induced ionotropic gelation of sodium alginate was used as a technique for the manufacture of micropellets. This approach employs sodium alginate as a natural main polymer and calcium chloride as a crosslinking agent. In the presence of calcium ions, droplets of sodium alginate-drug combination or dispersion instantaneously form a cured gel matrix (Ca-Alg). The Ca-Alg matrix serves both as a medium for drug delivery and as a material in biomedical engineering. The created micropellets were then supported by using several polymers, namely Eudragit NE30D (a synthetic, water-insoluble aqueous polymeric dispersion) and Eudragit

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FORMULATION AND OPTIMIZATION OF GRISEOFULVIN TERNARY COMPLEX WITH B-CYCLODEXTRIN AND PVP K30 FOR ENHANCED SOLUBILITY AND BIOAVAILABILITY

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ABSTRACT

The study focuses on the formulation and optimization of a ternary complex of griseofulvin using β-cyclodextrin (β-CD) and PVP K30 to enhance the drug's solubility and bioavailability. Griseofulvin, an antifungal agent, has limited water solubility, which hinders its absorption and therapeutic effectiveness. The inclusion of β-CD, a cyclic oligosaccharide, and PVP K30, a hydrophilic polymer, aims to improve its solubility by forming a ternary inclusion complex.

The complex was prepared using the solvent evaporation method, and the formation of the ternary complex was confirmed by Fourier-transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), and scanning electron microscopy (SEM), which demonstrated the molecular interactions between griseofulvin, β-CD, and PVP K30. The solubility of the ternary complex was assessed using the shake-flask method, showing a significant improvement in griseofulvin's aqueous solubility compared to its pure form.

The in vitro release studies indicated a faster and more sustained release profile of the ternary complex compared to pure griseofulvin. Dissolution efficiency was notably higher, suggesting enhanced bioavailability potential. Furthermore, the pharmacokinetic analysis using an animal model showed improved absorption and systemic availability of griseofulvin from the ternary complex, with a higher Cmax and a longer Tmax.

In conclusion, the formulation of a griseofulvin-β-cyclodextrin-PVP K30 ternary complex offers a promising approach for improving the solubility and bioavailability of griseofulvin, enhancing its therapeutic potential for fungal infections. Further clinical studies are warranted to confirm the efficacy and safety of this enhanced formulation.

I. INTRODUCTION

Griseofulvin is a well-known antifungal agent widely used to treat superficial fungal infections, particularly dermatophytes. However, its clinical effectiveness is limited by its poor aqueous solubility, which leads to low oral bioavailability and slow onset of action. The solubility and bioavailability of griseofulvin need to be improved to optimize its therapeutic efficacy and reduce potential side effects caused by higher doses.

Cyclodextrins, specifically β-cyclodextrin (β-CD), have gained significant attention in pharmaceutical formulations due to their ability to form inclusion complexes with hydrophobic drugs, thereby improving their solubility. β-CD consists of a cyclic structure of glucose units, which can encapsulate hydrophobic drug molecules

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EXPLORING RECREATIONAL HEALTH PRACTICES OF PREGNANT WOMEN ATTENDING ANTENATAL CLINICS

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ABSTRACT

Recreational health practices during pregnancy, such as physical activity, nutrition, and relaxation techniques, play a critical role in maternal health and fetal development. However, there is limited research on the prevalence and nature of such practices among pregnant women, particularly those attending antenatal clinics. Understanding these practices can help in designing tailored interventions to promote maternal and fetal well-being.

To explore the recreational health practices of pregnant women attending antenatal clinics, with a focus on physical activity, dietary habits, and relaxation techniques.

A cross-sectional study was conducted among pregnant women attending antenatal clinics at selected healthcare centers. A structured questionnaire was administered to gather information on the types of recreational health practices, frequency, and duration of physical activities, dietary habits, and use of relaxation methods such as yoga or meditation. The data were analyzed to identify trends based on demographics such as age, gestational age, and socio-economic status.

A total of 250 pregnant women participated in the study. The majority (70%) reported engaging in light physical activities such as walking and prenatal yoga, while 30% did not participate in any form of recreational activity. About 50% of participants followed a balanced diet, incorporating fruits, vegetables, and lean proteins, while the remaining 50% exhibited irregular dietary habits. In terms of relaxation, 40% of women practiced mindfulness or meditation, and 25% engaged in breathing exercises. Recreational practices were more common in women with higher education and better socio-economic status. No significant associations were found between gestational age and recreational practices.

The study highlights the importance of recreational health practices, such as physical activity and relaxation, among pregnant women. While many women engage in beneficial practices, there is a need for enhanced awareness and guidance regarding the importance of these practices, particularly among those with lower socio-economic status. Healthcare providers should encourage and educate pregnant women on safe and effective recreational health practices to improve maternal and fetal health.

Keywords: Recreational health practices, pregnant women, antenatal clinics, physical activity, relaxation, dietary habits.

I. INTRODUCTION

The growth of one or more children, referred to as an embryo or foetus, in a woman's uterus is called pregnancy. This includes the time between the male sex cell fertilising the female sex cell and the child's birth. Another name for this time frame is the gestation period. According to Jukic, Baird, Weinberg, McConnaughey, and Wilcox (2013), the cells divide and expand quickly, becoming stable and large enough to be referred to be a foetus about

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A REVIEW ON MULTIDISCIPLINARY APPROACHES IN TREATING COVID-19 (SARS-COV-2) INFECTION

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ABSTRACT

The global outbreak of COVID-19, caused by the SARS-CoV-2 virus, has led to a significant public health crisis with far-reaching consequences. As the pandemic continues to evolve, various treatment approaches have been explored to combat the infection, ranging from antiviral medications to immune-modulating therapies, along with vaccine development. This review aims to provide a comprehensive overview of the multidisciplinary strategies employed in the management of COVID-19. We examine the current pharmacological treatments, including the use of antiviral drugs such as remdesivir, and corticosteroids like dexamethasone, along with emerging therapies like monoclonal antibodies. Additionally, the role of adjunct therapies, including vitamin D, zinc supplementation, and traditional medicine, is explored in terms of their potential efficacy. The review also highlights non-pharmacological interventions such as ventilation support, oxygen therapy, and the use of artificial intelligence in diagnosis and treatment monitoring. Furthermore, we discuss the significance of vaccination in controlling the spread of SARS-CoV-2 and the impact of variants on vaccine efficacy. This article provides a holistic view of the ongoing efforts to mitigate the effects of COVID-19, underscoring the importance of a multi-faceted approach involving both conventional and innovative therapies to manage and treat the infection effectively. The findings from this review are critical for guiding future research and treatment protocols in the fight against COVID-19.

I. INTRODUCTION

The COVID-19 pandemic, caused by the novel SARS-CoV-2 virus, has profoundly impacted global health, economies, and societies. Identified for the first time in December 2019, the virus rapidly spread worldwide, leading to millions of infections and deaths. The need for effective treatment strategies became apparent as the pandemic progressed, and healthcare systems were overwhelmed. Given the complex and dynamic nature of COVID-19, characterized by diverse clinical manifestations ranging from asymptomatic to severe respiratory failure, a multifaceted approach to its management has been essential.

The treatment of COVID-19 involves a combination of pharmacological and non-pharmacological interventions. Early efforts focused on repurposing existing antiviral drugs, while recent advancements have expanded to include immunotherapies, monoclonal antibodies, and novel antiviral agents. Additionally, supportive therapies such as mechanical ventilation, oxygen supplementation, and intensive care management have been crucial for critically ill patients.

Alongside these treatments, vaccines have played a pivotal role in mitigating the spread of the virus and reducing the severity of illness. However, the emergence of new SARS-CoV-2 variants has posed challenges to vaccine efficacy,

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DEVELOPMENT AND CHARACTERIZATION OF RISEDRONATE SODIUM NANOSPONGES: FORMULATION AND EVALUATION

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ABSTRACT

Risedronate sodium, a bisphosphonate, is commonly used for the treatment of osteoporosis and other bone-related disorders. However, its poor oral bioavailability and short half-life limit its therapeutic efficacy. Nanosponges, as a novel drug delivery system, offer the potential to enhance the solubility, stability, and controlled release of drugs. This study focuses on the development and characterization of risedronate sodium-loaded nanosponges to improve its therapeutic efficacy.

To formulate and evaluate risedronate sodium-loaded nanosponges for improved drug delivery, stability, and controlled release.

Risedronate sodium-loaded nanosponges were prepared using the solvent evaporation technique with various polymers, such as cyclodextrin derivatives and polycaprolactone. The nanosponges were characterized for their size, morphology, entrapment efficiency, and drug release profile. Particle size and surface morphology were analyzed using dynamic light scattering (DLS) and scanning electron microscopy (SEM), respectively. The entrapment efficiency and drug loading capacity were determined using UV spectrophotometry. The in vitro drug release was studied using a Franz diffusion cell, and the release kinetics were analyzed. Stability studies were also conducted to evaluate the long-term storage conditions.

The nanosponges exhibited a particle size range of 200–300 nm and spherical morphology. The entrapment efficiency of risedronate sodium was found to be approximately 85%, and the drug loading capacity was optimized to ensure effective delivery. The release studies indicated a sustained drug release over 24 hours, following Higuchi diffusion kinetics. Stability studies confirmed the stability of the nanosponges under standard storage conditions. The nanosponges showed enhanced solubility and stability of risedronate sodium compared to conventional formulations.

The risedronate sodium-loaded nanosponges demonstrated favorable physicochemical properties, including high drug entrapment efficiency, controlled release, and improved stability. This formulation offers a promising approach for enhancing the bioavailability and therapeutic efficacy of risedronate sodium in the treatment of osteoporosis and related bone diseases.

Keywords: Risedronate sodium, nanosponges, drug delivery, formulation, characterization, controlled release, osteoporosis.

1. INTRODUCTION

Derived from the Greek words osteon (bone) and poros (pore), osteoporosis is a progressive bone disease that is sometimes referred to as the "silent disease" because it progresses without any symptoms until a bone fracture happens as a result of changes in bone protein types, a decrease in bone mass density, and deterioration of bone microarchitecture. Numerous therapies are available to treat osteoporosis, including hormone replacement therapy, vitamin D and analogues, selective oestrogen receptor modulators, bone-forming agents, and antiresorptive drugs such bisphosphonates [1–7]. Because of their strong binding affinity for bones, bisphosphonates—which fall within the Biopharmaceutics Classification System class III category (freely soluble and low permeability)]—have been used to treat osteoporosis. Significantly small particle sizes in nanoscale formulations have the potential to

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EVALUATION OF HEPATOPROTECTIVE EFFECTS OF SELECTED PLANTS IN PARACETAMOL-INDUCED HEPATOTOXICITY

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ABSTRACT

Paracetamol (acetaminophen) is widely used as an analgesic and antipyretic; however, its overdose can lead to severe liver damage, known as hepatotoxicity. Traditional plant-based remedies have long been considered for their potential hepatoprotective properties. This study aims to evaluate the hepatoprotective effects of selected plants against paracetamol-induced hepatotoxicity in an experimental animal model. The plants were chosen based on their reported medicinal properties and historical use in liver health.

In this study, rats were administered a single dose of paracetamol to induce liver toxicity. The selected plants were then orally administered for a specified duration to assess their potential to mitigate liver damage. Liver function was assessed through biochemical markers, including serum levels of alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP). Histopathological examination of liver tissue was also conducted to evaluate cellular damage and the regeneration capacity of the liver.

The results demonstrated a significant reduction in serum enzyme levels and improvement in liver histology in the plant-treated groups compared to the paracetamol-only control group. The hepatoprotective effects observed suggest that the selected plants possess bioactive compounds that can attenuate liver damage induced by paracetamol overdose. Further phytochemical analysis revealed the presence of compounds such as flavonoids, alkaloids, and phenolics, which are known for their antioxidant and anti-inflammatory properties.

These findings support the traditional use of these plants in liver protection and provide a scientific basis for their potential use in treating paracetamol-induced hepatotoxicity. However, further studies are required to isolate the active compounds and fully understand their mechanism of action. This research opens the door for the development of plant-based therapeutic agents for liver protection, particularly in cases of paracetamol overdose.

Keywords: Hepatotoxicity, hepatoprotective, paracetamol, plant extracts, liver damage, biochemical markers, antioxidant, liver regeneration.

I. INTRODUCTION

Paracetamol (acetaminophen) is one of the most commonly used analgesics and antipyretics worldwide. While it is generally considered safe when used at therapeutic doses, overdose or prolonged use of high doses can result in severe hepatotoxicity. The liver is the primary organ involved in the metabolism of paracetamol, and excessive intake can lead to the accumulation of its toxic metabolites, causing oxidative stress, inflammation, and liver cell damage. In extreme cases, paracetamol-induced hepatotoxicity can lead to acute liver failure, which may necessitate liver transplantation or result in death. Thus, the

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EXPLORING PHARMACY STUDENTS' KNOWLEDGE, ATTITUDES, AND PERCEPTIONS OF PHARMACOGENOMICS

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ABSTRACT

Pharmacogenomics, the study of how genetic variations affect drug responses, is an emerging field in personalized medicine. As future healthcare professionals, pharmacy students must be equipped with an understanding of pharmacogenomics to provide optimal patient care. However, the level of knowledge, attitudes, and perceptions towards this field may vary.

To explore the knowledge, attitudes, and perceptions of pharmacy students regarding pharmacogenomics and its integration into pharmacy practice.

A cross-sectional survey was conducted among pharmacy students at a major university. The questionnaire assessed students' understanding of pharmacogenomics, their attitudes toward its clinical application, and their perceptions of its importance in future pharmacy practice. Data were analyzed to identify trends based on academic year, previous exposure to pharmacogenomics, and demographic variables.

A total of 200 pharmacy students participated in the survey. The results indicated that while the majority of students (65%) had basic knowledge of pharmacogenomics, fewer than 30% were confident in applying this knowledge in clinical practice. Students expressed positive attitudes toward the integration of pharmacogenomics into pharmacy education, with 80% believing it would improve patient outcomes. However, only 40% felt adequately prepared to use pharmacogenomic information in their future practice. The level of knowledge was significantly associated with prior exposure to pharmacogenomics coursework ($p<0.05$).

Pharmacy students generally recognize the importance of pharmacogenomics in personalized medicine but feel underprepared to apply it in clinical settings. There is a clear need for enhanced educational initiatives and practical training in pharmacogenomics to better equip pharmacy students for their roles in precision medicine.

Keywords: Pharmacogenomics, pharmacy students, knowledge, attitudes, perceptions, personalized medicine..

I. INTRODUCTION

Interindividual variability is a significant issue in optimum pharmacotherapy. While the majority of approved pharmaceuticals are efficacious and well-tolerated, up to 50% of patients get no benefit from some treatments, and others may have adverse drug reactions (ADRs). This results in diminished treatment adherence, heightened morbidity and mortality, or necessitates further therapy that exacerbates psychological suffering and economic cost for both the person and society.Adverse drug reactions (ADRs) are projected to be the fourth greatest cause of mortality in the United States.Three In Canada, over 200,000 serious adverse drug reactions (ADRs) are recorded each year, resulting in up to 22,000 fatalities and incurring costs to the healthcare system ranging from $13.7 billion to $17.7 billion.Four Comparable instances have been documented in several nations, making the problem a considerable healthcare burden globally, especially with a progressively ageing population and growing multimorbidity.5.6 To mitigate interindividual variability in medication response, the idea of "precision medicine" has been established, aiming to individualise treatment strategies and enhance patient outcomes. It is estimated that up to 95% of the variance in pharmacological effectiveness and acceptability is due to genetic variations across people, with between 80% and 99.5% of the population possessing an actionable genetic

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SPECTROPHOTOMETRIC ANALYSIS AND METHOD VALIDATION FOR RISPERIDONE QUANTIFICATION IN PHARMACEUTICAL TABLETS AND PURE FORM

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ABSTRACT

Risperidone, an atypical antipsychotic, is widely used in the treatment of various psychiatric disorders. Accurate quantification of risperidone in both its pure form and in pharmaceutical tablet formulations is crucial for quality control and therapeutic efficacy. This study focuses on the development and validation of simple, reliable, and cost-effective spectrophotometric methods for the determination of risperidone in pure and tablet dosage forms.

Two spectrophotometric methods were developed based on the measurement of absorbance at specific wavelengths in appropriate solvents. Method I utilized a direct UV absorbance method, while Method II involved the formation of a colored complex with an appropriate reagent, allowing for the quantification of risperidone. Both methods were optimized by evaluating parameters such as solvent selection, pH, and concentration ranges to achieve accurate and precise results.

The developed methods were validated according to ICH (International Council for Harmonisation) guidelines, including tests for linearity, accuracy, precision, limit of detection (LOD), limit of quantification (LOQ), and robustness. The results demonstrated excellent linearity over a wide concentration range, with correlation coefficients greater than 0.999 for both methods. The accuracy and precision of the methods were confirmed with low relative standard deviations (RSD), indicating their reliability. Additionally, the LOD and LOQ values were found to be within acceptable limits, demonstrating the sensitivity of the methods.

The applicability of the methods was successfully tested by determining the concentration of risperidone in commercially available tablet formulations, with results consistent with the labeled content. The methods were also robust, showing no significant variation under slight changes in experimental conditions.

In conclusion, the developed spectrophotometric methods are simple, rapid, and suitable for routine quality control analysis of risperidone in both pure and tablet dosage forms. The methods offer an affordable alternative to more complex techniques, making them ideal for use in pharmaceutical laboratories and quality control settings.

Keywords: Risperidone, spectrophotometry, method validation, pharmaceutical tablets, quality control, UV absorbance, reagent complex.

I. INTRODUCTION

Risperidone is an atypical antipsychotic drug widely used in the treatment of psychiatric disorders such as schizophrenia, bipolar disorder, and irritability associated with autism. It acts by modulating the activity of neurotransmitters in the brain, particularly serotonin and dopamine receptors. As with all pharmaceutical drugs, ensuring the accurate and precise determination of risperidone in both pure and dosage forms is critical for guaranteeing its efficacy, safety, and compliance with pharmacopoeial standards.

The determination of active pharmaceutical ingredients (APIs) in formulations is an essential part of quality control and regulatory compliance in the pharmaceutical industry. Among the various analytical techniques, spectrophotometry stands out as a widely utilized method due to its simplicity, affordability, and non-destructive nature. Spectrophotometric methods are based on measuring the absorption of light by a substance at a specific wavelength, providing a quick and reliable way to determine the concentration of the analyte in solution. This technique can be particularly advantageous in routine laboratory testing, where rapid and cost-effective analysis is needed.

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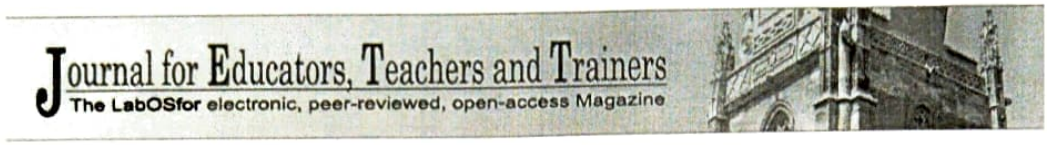

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FORMULATION AND EVALUATION OF LULICONAZOLE-LOADED NIOSOMAL GEL FOR TREATING FUNGAL INFECTIONS

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ABSTRACT

Luliconazole is an effective antifungal agent used for the treatment of superficial fungal infections, but its poor bioavailability and limited penetration into the skin often hinder its clinical effectiveness. Niosomal formulations, which use non-ionic surfactants to encapsulate drugs, offer an innovative approach to enhance drug delivery and improve therapeutic outcomes. This study aims to formulate and evaluate a luliconazole-loaded niosomal gel for enhanced treatment of fungal infections.

To design and evaluate a luliconazole-loaded niosomal gel, assessing its physical properties, drug release profile, skin permeation, and antifungal efficacy.

Luliconazole-loaded niosomes were prepared using the thin-film hydration method with various non-ionic surfactants, such as Span 60 and cholesterol. The niosomal formulation was characterized for size, shape, drug entrapment efficiency, and stability. The gel was prepared by dispersing the niosomal dispersion in a gelling agent like carbopol. The gel's rheological properties, spreadability, and drug release kinetics were evaluated. In vitro antifungal activity was tested against common fungal strains, including Candida albicans and Trichophyton rubrum, using the disc diffusion method. Skin permeation studies were conducted using a Franz diffusion cell.

The niosomal gel exhibited good homogeneity and a controlled release profile, with a sustained release of luliconazole over 24 hours. The drug encapsulation efficiency was found to be over 85%, and the gel showed a significant antifungal effect against Candida albicans and Trichophyton rubrum. Skin permeation studies revealed enhanced penetration of luliconazole into the skin layers compared to the free drug solution. The gel demonstrated good rheological properties, ease of application, and stability over time.

The luliconazole-loaded niosomal gel was successfully formulated and showed promising results in terms of drug release, skin permeation, and antifungal efficacy. This formulation offers an innovative approach to improve the delivery of luliconazole, providing a potential solution for effective treatment of fungal infections.

Keywords: Luliconazole, niosomal gel, fungal infections, drug delivery, skin permeation, formulation, antifungal efficacy..

I. INTRODUCTION

Despite being the most effective way to provide medicine, oral drug delivery has limitations, particularly when it comes to treating fungal infections of the skin. Due to its lack of presystemic metabolism, less biological toxicity, and increased customer satisfaction, topical medication administration has emerged as a superior alternative to oral delivery. The human body's outermost layer is shielded from the environment by the skin. Because they are easier to apply and have better topical penetration than other semisolid formulations, niosomal gels

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CHARACTERIZATION AND PHARMACOKINETIC ASSESSMENT OF NAPROXEN FORMULATIONS: DESIGN AND DEVELOPMENT INSIGHTS

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ABSTRACT

The study presents a comprehensive approach to the formulation, design, and pharmacokinetic assessment of naproxen formulations, focusing on their development and characterization for enhanced therapeutic efficacy. Naproxen, a widely used non-steroidal anti-inflammatory drug (NSAID), is often associated with gastrointestinal and other systemic side effects. The goal of this research was to design optimized naproxen formulations that improve drug release and bioavailability while minimizing side effects.

Various formulation techniques were explored, including solid dispersion, microencapsulation, and nanoformulations, aimed at enhancing the solubility and stability of naproxen. The characterization of these formulations involved a series of in-depth analyses, including drug release studies, scanning electron microscopy (SEM), differential scanning calorimetry (DSC), and X-ray diffraction (XRD), to assess the physical properties, morphology, and drug content uniformity.

In vitro pharmacokinetic assessments were carried out to evaluate the drug release profiles and to predict the absorption kinetics of the formulations. The formulations were subjected to dissolution studies, and the release data were analyzed using various models to understand the release mechanism. Additionally, the in vitro pharmacokinetics were used to estimate the bioavailability and potential improvements in the therapeutic action of the drug.

The results indicated significant improvements in drug release, solubility, and bioavailability for certain formulations, with enhanced stability and reduced risk of side effects. These findings suggest that advanced drug delivery strategies can offer substantial benefits for naproxen therapy, paving the way for the development of more effective NSAID formulations.

This research highlights the importance of innovative formulation techniques in improving the pharmacokinetics of naproxen, providing insights into how drug release and bioavailability can be optimized for better clinical outcomes.

I. INTRODUCTION

The study presents a comprehensive approach to the formulation, design, and pharmacokinetic assessment of naproxen

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EFFERVESCENT FLOATING TABLETS OF CIPROFLOXACIN HYDROCHLORIDE: FORMULATION AND IN VITRO EVALUATION

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ABSTRACT:

Ciprofloxacin hydrochloride is a broad-spectrum antibiotic used to treat various bacterial infections. However, its short half-life and the need for frequent dosing can limit its therapeutic effectiveness. Effervescent floating tablets offer a promising solution by providing controlled drug release and prolonged gastric retention, thus improving bioavailability and patient compliance. This study focuses on the formulation and in vitro evaluation of effervescent floating tablets of ciprofloxacin hydrochloride.

To formulate effervescent floating tablets of ciprofloxacin hydrochloride and evaluate their in vitro performance, including buoyancy, drug release, and stability.

Effervescent floating tablets of ciprofloxacin hydrochloride were formulated using different polymers, such as hydroxypropyl methylcellulose (HPMC) and sodium alginate, along with effervescent agents (sodium bicarbonate and citric acid). The tablets were evaluated for various physicochemical properties, including weight variation, hardness, friability, and drug content. The buoyancy characteristics were determined by measuring the floating lag time and the duration of floating. In vitro drug release studies were conducted using a USP dissolution apparatus in simulated gastric fluid (SGF). The release kinetics were analyzed using mathematical models such as zero-order, first-order, and Higuchi models. Stability studies were also carried out to assess the long-term storage conditions of the tablets.

The effervescent floating tablets exhibited good physicochemical properties, with a floating lag time of less than 2 minutes and sustained buoyancy for up to 8 hours. The drug release studies showed a controlled release profile over 8 hours, following Higuchi's diffusion model. The tablets provided a steady release of ciprofloxacin hydrochloride, with no

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DEVELOPMENT AND VALIDATION OF AN ANALYTICAL METHOD FOR MICONAZOLE NITRATE AND EUGENOL IN SYNTHETIC MIXTURES

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ABSTRACT

Miconazole nitrate and eugenol are widely used for their antifungal and analgesic properties, often formulated together in synthetic mixtures for enhanced therapeutic effects. Accurate and reliable analytical methods are essential for their simultaneous quantification to ensure formulation quality and efficacy.

To develop and validate a simple, accurate, and precise analytical method for the simultaneous determination of miconazole nitrate and eugenol in synthetic mixtures.

A high-performance liquid chromatography (HPLC) method was developed for simultaneous analysis. The method was optimized using a reverse-phase column with a suitable mobile phase, flow rate, and detection wavelength. Validation was performed following ICH guidelines, assessing parameters such as linearity, accuracy, precision, specificity, limit of detection (LOD), and limit of quantification (LOQ). The robustness and stability of the method were also evaluated.

The developed method showed excellent linearity for miconazole nitrate (10-100 µg/mL) and eugenol (5-50 µg/mL) with correlation coefficients (R^2 > 0.99). Accuracy studies demonstrated recovery rates of 98-102%. Precision results indicated low relative standard deviations (<2%). The method was specific with no interference from excipients. LOD and LOQ values were 0.5 µg/mL and 1.5 µg/mL for miconazole nitrate, and 0.2 µg/mL and 0.8 µg/mL for eugenol, respectively. The method was robust under slight variations in analytical conditions.

The developed HPLC method is reliable, accurate, and validated for the simultaneous quantification of miconazole nitrate and eugenol in synthetic mixtures. It can be effectively applied for routine quality control and stability testing of pharmaceutical formulations containing these compounds.

Keywords: Miconazole nitrate, eugenol, HPLC, analytical method validation, synthetic mixtures, quality control.

I. INTRODUCTION

Fungus infections continue to pose a growing concern to human health. Inappropriate and illogical use of antifungal chemotherapeutics resulted in poor treatment effectiveness, undesirable toxicity, and the rise of multidrug-resistant fungal diseases.[1] Combination treatment may be used to treat infectious fungal

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ADVANCEMENTS IN ANALYTICAL TOOLS FOR METABOLOMICS APPLICATIONS

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ABSTRACT

Metabolomics is an emerging field that involves the comprehensive analysis of metabolites in biological systems, providing crucial insights into metabolic pathways, disease mechanisms, and therapeutic targets. The rapid development of analytical tools has significantly advanced the capabilities of metabolomics, allowing for more accurate, high-throughput, and sensitive analysis of complex metabolic profiles. This abstract explores the key advancements in analytical techniques used in metabolomics, including mass spectrometry (MS), nuclear magnetic resonance (NMR) spectroscopy, and chromatography-based methods.

Mass spectrometry has emerged as one of the most powerful tools in metabolomics, offering high sensitivity and specificity for detecting and quantifying metabolites in complex biological samples. The integration of high-resolution MS with advanced ionization techniques, such as electrospray ionization (ESI) and matrix-assisted laser desorption/ionization (MALDI), has enabled researchers to identify a wide range of metabolites with greater precision. Additionally, NMR spectroscopy continues to be a valuable tool for metabolomics due to its non-destructive nature and ability to provide structural information on metabolites, though its sensitivity is generally lower than MS.

Chromatography techniques, including gas chromatography (GC) and liquid chromatography (LC), have been widely utilized in combination with MS and NMR for effective separation and identification of metabolites. The development of new stationary phases, coupled with advances in high-performance liquid chromatography (HPLC), has enhanced the resolution and throughput of metabolic analysis. Furthermore, the integration of computational tools for data analysis, such as machine learning algorithms and multivariate statistical approaches, has enabled the interpretation of large and complex metabolomic datasets, improving the identification of biomarkers and the understanding of metabolic networks.

These advancements in analytical tools have broadened the scope of metabolomics, facilitating applications in personalized medicine, disease biomarker discovery, drug development, and nutrition research. Despite significant progress, challenges remain, including the need for standardization of methods, improving sensitivity, and managing large-scale data analysis. Continued innovation in analytical technologies and computational methods will further accelerate the growth and application of metabolomics in clinical and research settings.

Keywords: Metabolomics, analytical tools, mass spectrometry, NMR spectroscopy, chromatography, data analysis, biomarkers, personalized medicine.

I. INTRODUCTION

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A STUDY ON ANTIPLATELET AGENT UTILIZATION AND PATIENT-SPECIFIC DRUG PROBLEMS IN A CARDIOLOGY SETTING

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ABSTRACT

Background:

Antiplatelet agents are pivotal in the management and prevention of cardiovascular diseases. However, their use is often accompanied by patient-specific drug-related problems (DRPs) that may compromise therapeutic outcomes. This study aims to explore the utilization patterns of antiplatelet agents and identify associated DRPs in cardiology patients at a tertiary care teaching hospital.

Objective:

To analyze the prescribing patterns of antiplatelet agents and assess the prevalence and nature of patient-specific drug-related problems in a cardiology setting.

Methods:

A prospective observational study was conducted over six months in the cardiology department of a tertiary care teaching hospital. Adult patients receiving antiplatelet therapy were included. Data on demographics, clinical history, and drug prescriptions were collected. DRPs were identified and categorized using a standard classification system. Statistical analyses were performed to examine associations between patient characteristics, drug utilization patterns, and the occurrence of DRPs.

Results:

The study included 200 patients, with a mean age of 58 years. Dual antiplatelet therapy (DAPT) was prescribed in 72% of cases, predominantly aspirin and clopidogrel. Common DRPs identified included adverse drug reactions (18%), drug interactions (14%), and suboptimal dosing (12%). Factors significantly associated with DRPs were advanced age, polypharmacy, and comorbid conditions ($p<0.05$). Interventions, including dose adjustments and patient education, effectively resolved 85% of the identified DRPs.

Conclusion:

Antiplatelet agents are widely utilized in cardiology practice, with dual therapy being the most common regimen. However, patient-specific DRPs are prevalent and warrant careful monitoring and management. The study underscores the importance of individualized patient care and regular medication reviews to optimize therapeutic outcomes.

Keywords: Antiplatelet agents, drug-related problems, cardiology, dual antiplatelet therapy, tertiary care teaching hospital..

I. INTRODUCTION

Cardiovascular disease is one of the major causes of mortality in India. There are two highly predominant conditions; ischemic heart disease and stroke are responsible for >80%of CVD deaths. According to the Global Burden of Disease study, it is estimated that nearly onefourth of all the death in India occurs because of CVD in 2010. Premature mortality ratio in terms of years of life lost because of CVD. In India ratio of mortality increased by 59% from

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A PROSPECTIVE STUDY ON THE INCIDENCE AND RISK FACTORS OF CONTRAST-INDUCED NEPHROPATHY IN PATIENTS UNDERGOING PCI

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ABSTRACT

Background: Contrast-induced nephropathy (CIN) is a significant complication of percutaneous coronary intervention (PCI), associated with increased morbidity and mortality in cardiology patients. Understanding the incidence and identifying modifiable risk factors is critical for optimizing preventive strategies.

Objective: This study aims to evaluate the incidence of CIN and explore associated risk factors among cardiology in-patients undergoing PCI.

Methods: A prospective observational study was conducted at [Hospital Name], enrolling [sample size] patients undergoing PCI. CIN was defined as an increase in serum creatinine by ≥25% or ≥0.5 mg/dL within 48–72 hours after contrast exposure. Data on demographics, baseline renal function, comorbidities, contrast volume, and procedural details were collected. Statistical analysis was performed to identify significant predictors of CIN.

Results: The incidence of CIN was observed in [percentage]% of the study population. Significant risk factors included [e.g., advanced age, pre-existing renal dysfunction, diabetes mellitus, and higher contrast volume]. Patients with [specific characteristic, e.g., low eGFR] exhibited the highest risk of developing CIN. Preventive measures, such as hydration and minimized contrast usage, were associated with reduced CIN incidence.

Conclusion: CIN remains a prevalent complication in PCI patients, with identifiable risk factors such as pre-existing renal dysfunction and diabetes. Early risk assessment and implementation of preventive strategies can mitigate CIN incidence and improve patient outcomes.

Keywords: contrast-induced nephropathy, percutaneous coronary intervention, risk factors, cardiology, incidence, renal dysfunction.

I. INTRODUCTION

Contrast-induced nephropathy (CIN) is a well-recognized complication following percutaneous coronary intervention (PCI), characterized by a decline in renal function after exposure to contrast media. Defined as an increase in serum creatinine by ≥25% or ≥0.5 mg/dL within 48–72 hours post-contrast exposure, CIN is associated with increased morbidity, prolonged hospital stays, and higher mortality rates. Its prevalence varies widely, ranging from 3% to 25%, depending on patient characteristics and procedural factors.

PCI has become a cornerstone in the management of coronary artery disease, significantly improving survival and quality of life in patients with acute coronary syndromes and chronic coronary conditions. However, the widespread

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COMPARATIVE EVALUATION OF DIFFERENT COVID-19 VACCINES: EFFICACY AND SAFETY PROFILES

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ABSTRACT

The global response to the COVID-19 pandemic has seen the development and deployment of several vaccines aimed at controlling the spread of the virus. Each vaccine has unique characteristics regarding efficacy, safety, and immune response. A comparative evaluation of these vaccines is essential to guide public health decisions and improve vaccination strategies.

To compare the efficacy and safety profiles of different COVID-19 vaccines currently in use, including mRNA, viral vector, and protein subunit vaccines.

A systematic review and meta-analysis were conducted to evaluate data from clinical trials and real-world studies on the efficacy and safety of various COVID-19 vaccines. The vaccines included in the analysis were Pfizer-BioNTech, Moderna, AstraZeneca, Johnson & Johnson, and Sinovac. Efficacy was assessed in terms of prevention of symptomatic COVID-19, severe disease, and hospitalization. Safety profiles were examined through the incidence of common and severe adverse events.

The analysis revealed that mRNA vaccines (Pfizer-BioNTech and Moderna) demonstrated the highest efficacy in preventing symptomatic infection and severe outcomes, with efficacy rates exceeding 90% in early trials. Viral vector vaccines (AstraZeneca and Johnson & Johnson) showed slightly lower efficacy, ranging from 60% to 80%, but still provided significant protection against severe disease and hospitalization. The protein subunit vaccine (Sinovac) had a lower efficacy rate in preventing symptomatic infection (around 50%), but still contributed to reduced severity and hospitalizations. Safety profiles indicated that mRNA vaccines were generally well-tolerated, with mild to moderate side effects such as sore arms, fatigue, and fever. Rare severe adverse events, including myocarditis and thrombosis, were observed in some vaccines but remained infrequent.

All the vaccines analyzed showed high efficacy in preventing severe COVID-19 outcomes, though mRNA vaccines demonstrated superior efficacy in preventing symptomatic infection. Safety profiles were generally favorable, with most adverse events being mild and transient. Continued monitoring and comparative studies are necessary to evaluate the long-term efficacy and safety of these vaccines, particularly in diverse populations.

Keywords: COVID-19 vaccines, efficacy, safety profiles, mRNA vaccines, viral vector vaccines, protein subunit vaccines..

I. INTRODUCTION

Wuhan, China, reported the first detection of a new severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in December 2019. As a result, the extremely contagious Coronavirus Disease 2019 (COVID-19) spreads over the globe and turns into a pandemic. Despite

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DESIGN AND OPTIMIZATION OF FLOATING TABLETS FOR CONTROLLED RELEASE OF CHLORTHIAZIDE

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ABSTRACT

The aim of this study was to design, formulate, and optimize a floating drug delivery system (FDDS) for chlorthiazide, a thiazide diuretic, to achieve controlled release and prolonged therapeutic effects. The objective was to improve the bioavailability of chlorthiazide by prolonging its gastric retention time using a floating tablet formulation. Floating tablets were prepared using various polymers, including hydroxypropyl methylcellulose (HPMC), sodium bicarbonate, and gellan gum, which were selected based on their ability to form a buoyant system and control drug release. The tablets were characterized for their physical properties, including hardness, friability, weight variation, and in vitro buoyancy.

The in vitro release of chlorthiazide was studied using a USP dissolution apparatus, and the release profiles were evaluated for the effects of different formulation variables such as polymer concentration and the presence of effervescent agents. The effect of these variables on the drug release rate and floating behavior was optimized using central composite design (CCD) and response surface methodology (RSM).

The results showed that the floating tablets exhibited good buoyancy for more than 12 hours, with controlled drug release over an extended period. The release kinetics followed the Higuchi model, indicating a diffusion-controlled release mechanism. Optimization revealed that an optimal combination of HPMC and sodium bicarbonate produced the desired floating behavior and controlled release. The stability studies confirmed that the tablets remained stable under accelerated conditions.

In conclusion, the developed floating drug delivery system for chlorthiazide demonstrated promising potential for improving the pharmacokinetic profile of the drug by prolonging its gastric residence time and providing controlled release. This approach could offer significant therapeutic advantages in the management of conditions requiring long-term diuretic therapy.

Keywords: Floating drug delivery system, chlorthiazide, controlled release, HPMC, sodium bicarbonate, optimization, bioavailability.

1. INTRODUCTION

Floating drug delivery systems (FDDS) have emerged as an innovative approach to improve the bioavailability and therapeutic efficacy of drugs, particularly those with a narrow absorption window in the upper gastrointestinal tract. These systems are designed to float in the stomach for an extended period, thereby increasing the gastric retention time (GRT) of the drug, which in turn allows for prolonged release and enhanced absorption. FDDS is particularly beneficial for drugs that are poorly soluble in water, exhibit first-pass metabolism, or have a short half-life.

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DEVELOPMENT AND CHARACTERIZATION OF TERBINAFINE HCL-LOADED MICROEMULGEL FOR TOPICAL DRUG DELIVERY

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ABSTRACT

The objective of this study was to develop and characterize a terbinafine HCl-loaded microemulgel for enhanced topical drug delivery. Terbinafine HCl, a potent antifungal agent, is commonly used to treat superficial fungal infections but often faces challenges in achieving effective skin penetration and prolonged release. To address these issues, we formulated a microemulgel, combining microemulsion and gel-based systems, to optimize the solubility, stability, and controlled release of terbinafine HCl. The microemulgel was prepared using a water-in-oil microemulsion method, with surfactants (such as polysorbate 80), co-surfactants (like propylene glycol), and oils (such as castor oil) to ensure the stability and efficient encapsulation of the drug.

The physicochemical properties of the microemulgel, including pH, viscosity, and spreadability, were thoroughly evaluated. The drug content and in-vitro release studies demonstrated a sustained release profile, with the microemulgel offering an improved rate of drug diffusion through the skin compared to traditional gel formulations. The stability studies indicated that the formulation remained stable under different temperature and light conditions. In-vitro skin penetration studies showed a significant increase in drug permeation, suggesting the microemulgel's potential for enhanced topical delivery.

Overall, the terbinafine HCl-loaded microemulgel formulation offers a promising approach for topical drug delivery, providing sustained antifungal activity, improved skin penetration, and patient comfort due to its gel-like consistency. This formulation holds potential for clinical applications in treating dermatophytic infections with better efficacy and fewer side effects than conventional formulations.

I. INTRODUCTION

Terbinafine hydrochloride (HCl) is a highly effective antifungal agent, primarily used for the treatment of dermatophyte infections such as athlete's foot, ringworm, and onychomycosis. Despite its efficacy, the oral administration of terbinafine can be associated with systemic side effects, and conventional topical formulations such as creams and ointments often fail to achieve adequate skin penetration or provide sustained drug release. These limitations highlight the need for a more effective topical delivery system that can improve the bioavailability, penetration, and efficacy of the drug at the site of infection.

Recent advances in drug delivery systems have focused on the development of microemulsions, which are thermodynamically stable mixtures of water, oil, and surfactants that offer improved solubilization of lipophilic drugs and enhanced skin penetration. When incorporated into a gel-based system, the resulting formulation, termed microemulgel, combines the benefits of both

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A STUDY ON DRUG UTILIZATION AND TREATMENT PROTOCOLS IN BURN CARE

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ABSTRACT

Burn injuries are a significant cause of morbidity and mortality worldwide, requiring timely and effective treatment to prevent complications and promote recovery. This study aims to evaluate the drug utilization patterns and treatment protocols in burn care, focusing on the types of medications used, their appropriateness, and the adherence to established treatment guidelines. A retrospective analysis was conducted at a tertiary care hospital, reviewing patient records for burn cases over a one-year period. The study examined the types of drugs administered, including analgesics, antibiotics, antiseptics, and wound care agents, as well as their dosage, frequency, and duration of use.

The findings reveal that analgesics and antibiotics were the most commonly prescribed medications, with significant variability in the choice of antibiotics based on burn severity and infection risk. The use of topical agents, such as silver sulfadiazine and honey, was widespread for wound management, although their selection was not always in alignment with the latest evidence-based guidelines. Furthermore, the study identified gaps in the consistency of pharmacological treatments for burn patients, particularly concerning prophylactic antibiotic use, which was sometimes overprescribed in cases of minor burns.

The study also assessed the adherence to treatment protocols outlined by national and international guidelines. While there was general adherence to initial fluid resuscitation and pain management protocols, inconsistencies were noted in the long-term management of burn wounds and infection prevention. Several patients received treatments that were not in accordance with updated burn care standards, suggesting a need for improved awareness and training among healthcare providers.

In conclusion, this study underscores the importance of optimizing drug utilization and adherence to evidence-based treatment protocols in burn care. Recommendations include the standardization of drug prescriptions, enhanced training for healthcare professionals on current burn treatment guidelines, and the promotion of rational antibiotic use to avoid resistance and complications. By improving drug utilization practices, the quality of burn care can be significantly enhanced, leading to better patient outcomes and resource management in burn units.

Keywords: Burn treatment, drug utilization, treatment protocols, antibiotics, analgesics, wound care, burn care guidelines, pharmacological management.

I. INTRODUCTION

Burn injuries are among the most challenging and debilitating traumatic events, often leading to long-term physical and psychological consequences. According to the World Health Organization (WHO), burns are a significant

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Development and Evaluation of Lidocaine Hydrochloride Cubosomes directed by QbD

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ABSTRACT: Cubosomes, which are modified cubic phase systems, are looking very promising as a method of delivering both hydrophilic and lipophilic drugs. Transdermal delivery of cubosomes is currently gaining more importance over conventional topical delivery of drugs. The proposed study aimed to produce Lidocaine hydrochloride loaded cubosomes. This study was designed to prepare various formulations of Lidocaine nano cubsomal dispersions at different concentrations of lipid and stabilizer using optimization technique. For the purpose of prolonging the duration of the local anaesthetic action, Lidocaine-loaded cubosomes were developed by bottom up method utilizing Glyceryl mono oleate and Poloxamer 407 in various ratios using the "Quality by Design" approach, 3^2 factorial design employing statistical software. Within the confidence intervals, the 3^2 statistical design was effective at forecasting the optimized formulation's composition. Surface morphology, particle size, drug content, poly dispersibility index, zeta potential, entrapment efficiency, and *in vitro* drug release studies were conducted on the prepared formulations. Several mathematical models were used to conduct and assess an *in vitro* drug release investigation. The maximal entrapment efficiency for the LH8 formulation, which was validated to have optimum cubosomes dispersion, was reported to be 78 % with vesicle size as 150 nm, Zeta potential 21.5 mV and Poly Dispersibility Index as 0.08 along with an *in vitro* drug release 80.03 % by the end of 24 hours. A stable dispersion with appreciable results of evaluation parameters of cubosomal dispersion was conferred with formulation LH8. Hence from amongst the nine formulations developed, it is concluded that LH8 is selected as the optimized dispersion to be incorporated into a gel formulation.

KEYWORDS: Lidocaine Hydrochloride; Cubosomes; Design of Experiment; Quality by design; Glyceryl mono oleate; Poloxamer

1. INTRODUCTION

Cubosomes are distinct, diminutive nano composites that are part of the persistent cubicular liquid crystal phase [1]. They are made of polar and non-polar components of polymers, lipids, and surfactants, resulting in these are referred to as amphiphilic [2]. These nanoparticles can be produced using Top down and Bottom Up techniques [3]. They are self-organized liquid crystal particles of with surfactants, lipids and water in suitable proportions [4].

Lidocaine Hydrochloride is a well-known local anesthetic used to treat post-operative pains from minor procedures as well as symptomatic relief in burns, joints, muscles, hemorrhoids, and neuralgia [5]. The half-life of Lidocaine hydrochloride (LH), which is highly water soluble, is 1.5 to 2 hours. The majority of anesthetics have a tendency to bind to plasma proteins in the blood. This influences the duration of the drug's action [6]. To ensure dermal penetration and targeting, colloidal drug carriers such as microemulsions, vesicular carriers such as liposomes and niosomes, as well as both lipid and polymeric particulate carrier systems, were developed for topical delivery of Lidocaine Hydrochloride [7].

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A Cross-Sectional Study of the Association of ABO Blood Group and Rh Type with Severity of COVID-19 Infection in a Tertiary Care Center

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Abstract

Early reports have indicated a relationship between ABO and rhesus blood group types and infection with SARS-CoV-2. We aim to examine blood group type associations with COVID-19 mortality and disease severity. This is a retrospective chart review of patients ages 18 years or older admitted to the hospi- tal with COVID-19 between January 2020 and December 2021. The primary outcome was COVID-19 mortality with respect to ABO blood group type. The secondary outcomes were 1. Severity of COVID-19 with respect to ABO blood group type, and 2. Rhesus factor association with COVID-19 mortality and disease severity. Disease severity was defined by degree of supplemental oxygen requirements (ambient air, low-flow, high-flow, non-invasive mechanical ventilation, and invasive mechanical ventilation). The blood type was collected on 596 patients with more than half (54%, N=322) being O+. The ABO blood type alone was not statistically associated with mortality (P =0.405), while the RH blood type was statistically associated with mortality (P <0.001). There was statistically significant association between combined ABO and RH blood type and mor- tality (P =0.014). Out of the mortality group, the O+ group had the highest mortality (52.3%), followed by A+ (22.8%). The combined ABO and RH blood type was statistically significantly associated with degree of supplemental oxygen requirements (P =0.005). The Kaplan-Meier curve demonstrated that Rh- patients had increased mortality. ABO blood type is not associated with COVID-19 severity and mortality. Rhesus factor status is associated with COVID-19 severity and mortality. Rhesus negative patients were associated with increased mortality risk.

Keywords: COVID-19, Infectious disease, Pulmonary medicine, Mechanical ventilation, SARS-CoV-2

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1. Introduction

The ABO blood group, which includes the 4 blood types A, AB, B, and O, plays a role in various infectious and non-in- fectious human diseases. Histo-blood group antigens located on the surface of red blood cells represent inherited poly-morphic traits, and differences in the expression of these antigens affect susceptibility to many infections [1]. Blood group antigens act as receptors or coreceptors for pathogens such as hepatitis B virus, middle east respiratory syndrome associated coronavirus (MERS-CoV), severe acute respiratorysyndrome associated coronavirus (SARS-CoV), norovirus, malaria, other microorganisms, and parasites [1-4]. Additionally some blood group antigens can aid in intracellular uptake or signal transduction, subsequently altering the innate immune response to infection [1]. Early reports have indicated a significant relationship of ABO blood group types to the risk of infection with SARS-CoV-2 [1-4].

Many studies havedemonstrated that type O blood may have decreased risk of infection [5-13], while type A blood may be more suscep- tible to COVID-19 [2]. A hypothesized explanation includes the angiotensin

Potential Role of Graphene Oxide in Diagnosis and Treatment of Breast Cancer- An overview

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ABSTRACT

According to World Health Organization estimations, there are 2.3 million women diagnosed with breast cancer in 2020, with 6,85,000 deaths worldwide and 7.8 million women alive who have been diagnosed with breast cancer in the previous 5 years, making it the world's most prevalent cancer. Breast cancer is a diverse illness on a molecular level. Several critical unsolved clinical and scientific issues persist despite great advancements in the detection and treatment of breast cancer. Graphene-based materials have shown tremendous relevance for detecting/imaging, quality/drug conveyance, malignant growth treatment/finding, and tissue designing/regenerative medication. Indeed, graphene (G) and graphene oxide (GO)-based nano-structures are promising candidates for applications in cancer therapy due to their large surface area, ease of functionalization, high drug loading capacity, and reactive oxygen species induction potentials. For the application of graphene and graphene oxide-based nanosystems in cancer therapy, significant obstacles, recent advancements, and perspectives for the future are discussed.

Keywords: Cancer, breast cancer, graphene oxide, therapies, treatment of cancer, nanomaterials, nanostructures

INTRODUCTION

Every year, about 1.5 million women worldwide are diagnosed with breast cancer.[1-3] Breast cancer cases in the United States have gradually climbed during the last three decades. In the United States, 181,600 new cases of breast cancer have been detected, with 44,190 people dying as a result of the disease.[3,4]

The Breast is made up of adipose tissue, nerves, lymph, lymph vessels, blood vessels, and lymph nodes, all are supplied with adipose tissues. Both male and female breasts have glandular tissue, however, female breasts have more glandular tissue than male breasts. It