ABSTRACTS

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ORAL PRESENTATIONS

Cytotoxic Evaluation of Fe_3O_4 Nanoparticles Individually and Co-administered with Doxorubicin against Human Breast Cancer Cells (MDA-MB-468)

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Magnetic nanoparticles in an alternate magnetic field are able to produce heat. This heat (42-45°) has a selective effect on fast dividing cancer cells. The purpose of this research project was to evaluate if the Fe_3O_4 nanoparticles had a cytotoxic effect on a human breast cancer cell, individually or in a combination with doxorubicin, using trypan blue exclusion assay and flowcytometry. MDA-MB-468 grown in RPMI 1640 with 10% FCS were seeded (5×10^4 cell/m1) in 15 ml tubes. The suspended Fe_3O_4 nanoparticles, doxorubicin and a mixture of both were added to separate tubes and left either in the room temperature or in a magnetic field for 30 min. Then the number of viable cells was measured by trypan blue exclusion assay using a hemacytometer and flowcytometer, with aid of propidium iodide (PI). Briefly, 5 µl of PI was added to 3ml of treated cells and mixed. Then the viable cells were measured by flowcytometer. Fe_3O_4 nanoparticles alone in the room temperature were not cytotoxic, while in the magnetic filed 95% of cells were dead. Doxorubicin alone was cytotoxic to 50% of cells during 30 min, but using nano Fe_3O_4 in combination with doxorubicin killed all cells. Our findings showed that nano Fe_3O_4 in the magnetic field were more cytotoxic against MDA-MB-468 than doxorubicin. The combination of doxorubicin and nano Fe_3O_4 in the magnetic field showed much more cytotoxic influence than any other protocol used against tested cell line.

RP-HPTLC Method for the *In Vitro* Estimation of Edaravone in Human Plasma

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A specific, sensitive and fast method based on reverse phase high performance thin layer liquid chromatography (RP-HPTLC) was developed for the determination of edaravone in human plasma. No analytical methods reported so far for the estimation of edaravone. In present method a liquid liquid extraction (LLE) was used to isolate edaravone from biological matrix followed by spotting of the extracts onto a Pre coated RP-18 F_{254} aluminum sheet. Rf value was found to be 0.81±0.01. The LOD and LOQ were 25 ng/spot and 150 ng/spot respectively for edaravone. The method was validated over the concentration range of 600–2400 ng/spot for edaravone in spiked plasma with coefficient of correlation (r) = 0.938. The selectivity was proven by blank plasma extracted which has shown no interference at Rf value of edaravone. Recovery was calculated from the aqueous and unextracted peak areas and found to more than 65% at different concentrations in spiked plasma. Accuracy study shows good percentage recovery with low % RSD values. The plasma containing drug was found stable under refrigeration for 12 h. The proposed reverse phase high performance thin layer liquid chromatography (RP-HPTLC) method is cost effective and involves single step extraction procedure and can be used for routine analysis of edaravone in human plasma, pharmacokinetic and bioavailability studies.

Economic Impact of Cutaneous Adverse Drug Reactions in a South Indian Teaching Hospital

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Adverse drug reactions (ADRs) increase the morbidity, mortality and have significant impact on health care cost. Hospital-based ADR monitoring and reporting programmes aim to identify and quantify the risks associated with the use of drugs. Hence

the objective is to study the incidence, pattern and cost involved in the management of cutaneous adverse drug reactions, identify the influence of predisposing factors and assessment of causality, severity, preventability and the management of ADRs. The study was designed as cross sectional observation study in dermatology wards of a teaching hospital. The patients who were admitted during the period of Jan to Dec 2009 and those who developed ADRs were included for the study. Micromedex-Drug Reax System, WHO causality assessment, Hartwig *et al*. Scale and modified Schumock and Thornton Scale were used for the study. Out of 748 cases reviewed, 94 (12.57%) ADRs were identified. Number of male and female patients was 40 and 54 and mean age of the group was 36. The average number of drugs taken was 10, length of hospital stay was 3.6±0.53 days and the average cost per event was INR716. The present study was an intensive monitoring programme with an incidence of 12.57%, which is comparatively higher than previously reported studies from India. The poly pharmacy, older age were the most important risk factors for ADRs in this study population. The average cost of management of ADRs in the study patients was INR 716.

POSTER PRESENTATIONS

Pharmacy Education

Microwave-assisted Synthesis, Characterization and Antimicrobial Study of Some 2-Substituted-4,5-Diphenyl Imidazole Derivatives

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A simple and highly efficient method for a three-component condensation of benzil, aldehydes and ammonium acetate under microwave irradiation in the presence of glacial acetic acid in solvent-free condition to afford the corresponding 2-substituted 4,5-diphenylimidazole derivatives in high yields was carried out. The remarkable advantages offered by this method are inexpensive, simple procedure, much faster (1-4 min) reactions and high yield of products. The synthesized compounds were subjected to antimicrobial activity and were found to possess better activity. Among the tested compounds G4, G5, G6, G7, G11 and G12 exhibited higher antibacterial activity against *Staphylococcus aureus, Enterocooci, Salmonella typhi and Salmonella para typhi*-A, *Salmonella para typhi*-B. All the compounds displayed better antifungal activity against *Aspergillus niger, A. flavus, Rhizopus spp. and Candida albicans.*

Synthesis and Antibacterial Activity Screening of Some New 4-Aminoquinolines with Substituted Ring at Side Chain

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In the present study, some new 4-aminoquinoline analogues with substituted ring at side chain were synthesized and characterized by their physical, analytical and spectral data. In addition to evaluation of antimalarial activity, the synthesized compounds were also screened for antibacterial activity against six different strains of Gram positive (*Bacillus subtilis*, *Bacillus cereus*, *Staphyloccus aureus*) and Gram negative bacteria (*Eschericia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*). The results of antibacterial activity study revealed that all the compounds showed activity against all the six different tested strains, but were less active than that of standard drug ofloxacin. Among the synthesized compounds, the compounds with aromatic bulky substituents such as 4-methoxyphenyl, 4-(dimethylamino) phenyl, 5-methylthiophen-2-yl at C-2 position of 1,3-thiazinan-4-one ring system attached at the terminal propyl side chain of 7-chloro-4-aminoquinoline nucleus showed better antibacterial activity than that of the compound with aliphatic non-bulky ethyl substituent. Thus, results of the present study indicated that aromatic bulky groups have greater contributing effect to the antibacterial activity of the new series of 4-aminoquinoline analogues as compared to aliphatic non-bulky group.

Industrial Pharmacy

Study of Pharmacokinetic Evaluation of Rosiglitazone in Presence of Other Oral Hypoglycaemic, Antihypertensive and Hypolipedemic Drugs

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In 2010 an estimated amount of 265 million people, corresponding to 6.4% of the world's adult population have diabetes and this number is expected to grow to 7.8% i.e. around 438 million by 2030. India has the world largest diabetes population followed by China with 43.2 million. Hence the commonly used oral hypoglycaemic combination rosiglitazone and glicazide was selected for the study to estimate the pharmacokinetic parameters of rosiglitazone in presence of glicazide.75% of the people with diabetics have hypertension. Hence the interaction study of rosiglitazone with antihypertensives and hypolipidemics were performed. The various pharmacokinetic parameters like C_{max}, T_{max}, K_{el}, AUC, AUMC and MRT were calculated by determining the protein binding using equilibrium dialysis method. It was found that the pharmacokinetic parameter of rosiglitazone is altered in presence of antidiabetic, antihypertensive and hypolipedemic drugs.

A Factorial Study on the Evaluation of Formulation Variables on the Dissolution Rate of Etoricoxib Tablets

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Etoricoxib, a potent widely prescribed anti inflammatory and analgesic drug belongs to class-II under BCS and exhibit low and variable oral bioavailability due to its poor aqueous solubility. The Very poor aqueous solubility of the drug also gives rise to difficulties in the formulation of solid dosage forms and leads to poor and variable dissolution rate and oral bioavailability. The formulation variables greatly influence the dissolution rate and bioavailability of the drug from tablet dosage forms. The individual main and combined effects of commonly used binder, disintegrant and β-cyclodextrin on the dissolution rate of etoricoxib tablets were evaluated in a 2^3 factorial study. Etoricoxib tablets were formulated employing selected combination of binder, disintegrant and β-cyclodextrin as per 2^3 factorial design and the tablets were evaluated for various physical properties and dissolution rate (K_1). Dissolution parameters (K_1) were subjected to ANOVA of factorial design. The individual main effects of binder, disintegrant and β-cyclodextrin on the dissolution rate (K_1) are significant ($p<0.05$). Whereas their all combined (or interaction) effects are not significant ($p>0.05$). Among all etoricoxib tablets prepared, formulation Fa prepared employing PVP as binder and Potato starch as disintegrant gave highest dissolution rate of etoricoxib.

Formulation, Development and Evaluation of Compression-Coated Tablets of Tamsulosin Hydrochloride and Dutasteride

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The goal of any drug delivery system is to provide a therapeutic amount of drug to the proper site in the body to achieve promptly, and then maintain the desired drug concentration. One of the least complicated approaches to the manufacture of oral sustained release dosage forms involves the direct compression of a blend of drugs, retardant material, and the additives to form a tablet in which the drug is embedded in a matrix core of the retardant. Tamsulosin hydrochloride is an alpha one antagonist and dutasteride is 5-alpha reductase inhibitor used for the treatment of benign prostatic hyperplasia. The combination is safe, effective and well tolerated. The main objective of this study was to develop enteric coated modified release formulation, via matrix tablets for tamsulosin hydrochloride and dutasteride immediate release tablet as compression

- coated tablets. Various batches of tamsulosin hydrochloride matrix tablets, dutasteride granules were prepared and evaluated for pre and post compression characteristics. The ideal batches of tamsulosin hydrochloride were compressed with dutasteride granules followed by film coating and evaluated and in vitro release was compared with the marketed product.

Hospital Pharmacy

Drug Utilization Pattern in Patients with Renal Failure in Nephrology Unit of Tertiary Care Hospital

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Drug utilization research provides an insight regarding various aspects of drug use and drug prescribing. The rational use of drugs depends upon three perspectives that are patient perspective, physician perspective and healthcare environment, in which the patient is being treated. This tool was adapted by pharmacists to assess appropriateness of usage of various medications, to detect possible problems with, and improve, drug use. The aim of this study is to analyze current drug prescribing trends in Nephrology ward, Kasturba Hospital, Manipal. This is a retrospective observational study. Data regarding patient demographics, patient history notes, diagnosis and drugs discharged was collected from the discharge summary of a hundred (n=100) patients. It was observed that majority (19%) of the patients were falling in the age group of 50-60 years. With regard to the gender- wise distribution it was found that 65% were males and 35% were females. The average duration of hospitalization was found to be less than 5 days (53%). Majority of the patients were of chronic renal failure along with complications (71%). The average number of drugs per prescription was (7.49±3.25), indicating polypharmacy. The most commonly prescribed therapeutic classes of drugs were drugs for cardiovascular system (92%), drugs for gastrointestinal system (68%), antidiabetic drugs (34%), drugs for infections (50%), immunomodulators (8%), nutritional supplements (100%), steroids (16%) and drugs acting centrally (13%). This study describes various classes of drugs prescribed to patients by the nephrology unit in a tertiary care hospital. The use of diverse classes affords a pharmacist having adequate knowledge and resources, an opportunity to assist in patient care through the drug aspects.

Assessment of Plasma Homocysteine, Vitamin B12 and Folic Acid in Type II Diabetes Patients Treated with Metformin

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Metformin is one of the most common prescribed oral antihyperglycemic drug. The objective is to evaluate the effect of metformin, folic acid and vitamin B_{12} in type-II diabetic patients. A prospective study conducted in Kolar District, Karnataka. A total of 100 subjects were divided into five groups. Patients were kept as control in group A, newly diagnosed type-II diabetic patients in group B, diabetes treated with drugs other than metformin in group C, diabetes treated with only metformin in group D and finally diabetes treated with metformin and folic acid in group E. Homocysteine, folic acid, vitamin B_{12}, HbA_1C, lipid profiles was measured in the beginning and at the end of the study. Fasting blood sugar, blood pressure, kidney function test, urinalysis was measured in every visit of the patient to the hospital. Group D, the average levels plasma homocysteine while starting the study and end of the study was 15.95 µmol/l and 19.35 µmol/l, respectively. In group E the average levels plasma homocysteine while starting the study and end of the study was 18.05 µmol/l and 15.65 µmol/l, respectively. The results demonstrated that metformin can increase plasma homocysteine levels in placebo groups where as plasma homocysteine levels decreased Group E treated with folic acid in addition to metformin. The Present study indicates that metformin increases plasma homocysteine level in diabetic patients, where as administration of folic acid with metformin can prevent this process.

Regulatory Affairs

Method Development for Risedronate Sodium Hemi Penta Hydrate by UV Spectroscopy and High Performance Thin Layer Chromatography

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A simple, accurate and precise UV-spectroscopic method and a high performance thin layer chromatographic method for the determination of risedronate sodium hemi penta hydrate in bulk and in tablet dosage form were performed. In UV-spectroscopic method, 262 nm was selected as the detection wavelength. 0.05 M hydrochloric acid was chosen as the analytical solvent. The drug was found to be linear in the concentration range of 5-60 µg/ml. Tablet formulation containing 35 mg of risedronate sodium was chosen and quantification was performed and the percentage label claim was found to be as 99.11% w/w. Repeatability was performed in sextet. Accuracy of the method was confirmed by recovery studies, a known amount of raw material was added to the pre-analyzed formulation and percentage recovery was found to be 99.44% w/w. Followed by, high performance thin layer chromatographic method, after many trails, water:methanol:25% ammonia in the ratio of 100:15:15 v/v was chosen as the optimized mobile phase. The drug obeys beer's law in the concentration range of 3-6 µl/ml. Quantification was performed and the percentage label claim was found to be as 103.67% w/w. Repeatability was performed in sextet. Accuracy of the method was confirmed by recovery analysis, percentage recovered was found to be 98.60% w/w. The high percentage recovery proved that the methods revealed that the drug has no interference due to excipients present in the formulation. Thus the developed methods were applicable for routine analysis.

A Validated Ion Pair Liquid Chromatographic Method for the Simultaneous Estimation of Ceftriaxone Sodium and Tazobactum Sodium from Formulation

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A simple, efficient, fast, specific and sensitive validated ion pair liquid chromatographic method was developed for the simultaneous estimation of ceftriaxone sodium and tazobactum sodium in powder for injection dosage form. The estimation of ceftriaxone sodium and tazobactum sodium was carried out by using mixture of potassium dihydrogen phosphate (0.01M) and tetrabutyl ammonium hydroxide (0.012M):acetonitrile (70:30), pH 7 as mobile phase and measuring the response at 220 nm. The analysis was performed on a LichroCART C_{18} (250×4 mm), 5 µm column. The calibration curve was obtained for ceftriaxone sodium and tazobactum sodium at 2-12 µg/ml and 0.26-1.56 µg/ml with the correlation coefficient of 0.9982 and 0.9935, respectively. The method was validated according to the ICH guidelines. The LOD were found to be 50 ng/ml and 30 ng/ml and LOQ 500 ng/ml 100 ng/ml, respectively for ceftriaxone sodium and tazobactum sodium. The mean recovery and % RSD was 98.75, 0.97% and 99.82, 1.28% for ceftriaxone sodium and tazobactum sodium, respectively. The proposed ion pair liquid chromatographic method was successfully employed for the formulation and the amount estimated was in close agreement with % label claim. Hence this method can be used for routine analysis of cefrriaxone sodium and tazobactum sodium in dosage forms, stability and dissolution studies.

Community Pharmacy

A Study to Monitor the Adverse Drug Reactions of Antihypertensive Drugs

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The objective of the work was to conduct a study on adverse drug reactions (ARDs) of antihypertensive drugs in patients of selected hospitals and clinics in Nashik City. A prospective, hospital based, study was carried out in the 4 selected hospitals of Nashik city in an inpatient as well as outpatient setting. A one to one interaction with the patients diagnosed with ADRs was done. A voluntary ADR reporting form given by

CDSCO was filled describing the symptoms of the ADR observed, the medications used along with the patient information and relevant history needed. The seriousness of the ADRs was graded as per the WHO scale. The data obtained was studied and analyzed further. A total of 350 hypertensive patients screened of which 25 patients (7.14%) were diagnosed for ADRs; of which 16 were males while 9 were females. The maximum numbers of ADRs were observed in the age group 51-60 y with 28% of all the age groups. The ADRs mainly observed were dizziness, cold and headache amongst the potentially non-serious, while edema, hypotension, and bronchospasms were among the potentially serious category. The ADRs observed were maximum for the combination class of antihypertensive medications. ADRs have major public health and economic implications. This data suggests that there are limitations to the therapeutic safety of the antihypertensive drugs. More drug safety studies are needed to evaluate all possible ADRs and their mechanisms.

Prevalence of Thyroid Disorders in Coastal, Non-Coastal, Midland and Hilly Areas of Kerala along with the Toxicities due to Treatment

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Thyroid disorders are amongst the most common endocrine disorders in India. Prevalence and pattern of thyroid disorders depends on iodine intake, age, sex, ethnic and geographical factors. The objective is to determine the age specific incidence of thyroid disorders in different geographical areas of Kerala (coastal, non-coastal, midland, hilly region) and to find out the effect of thyroxin in reducing cholesterol level. A community survey was carried out to assess the suspected liver toxicity and neutropenia in patient taking carbimazole. Out of 60 patients, 30 were with hyperthyroidism received carbimazole 10 mg bd. Thirty patients with hypothyroidism received thyroxin 100 µg OD. The outcome measured were thyroid stimulating hormone (TSH), Free T3, Free T4, serum lipid profile, liver function tests and complete blood count were noted down. People in coastal area found to have less incidence hypothyroidism. Thyroxine has significant effect in reducing cholesterol level. There is a very rare incidence of neutropenia in patients taking carbimazole.