PHARMACY PRACTICE

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News Letter

PERCUTANEOUS CORONARY INTERVENTION (PCI) BIOABSORBABLE STENTS

Dr. Thomas John, MD, DNB, DM (Cardiology)

Stents improve immediate outcomes, including profoundly reducing acute vessel occlusion after PCI by scaffolding intimal tissue flaps that have separated from deeper layers and by optimizing vessel caliber. They limit restenosis by preventing negative remodeling. The intimal hyperplastic healing response to PCI that contributes to restenosis, especially after bare metal stenting, can be limited by coating stents with ant iproliferativemedications (Drug Eluting Sents).

Percutaneous coronary intervention (PCI) with bioabsorbable stents has created interest because the need for mechanical support for the healing artery is temporary, and beyond the first few months there are potential disadvantages of a permanent metallic prosthesis.

Potential advantages of having the stent disappear from the treated site include reduced or abolished late stent thrombosis, improved lesion imaging with computed tomography or magnetic resonance, facilitation of repeat treatments (surgical or percutaneous) to the same site, restoration of vasomotion, and freedom from side-branch obstruction by struts and from strut fracture-induced restenosis. Bioabsorbable stents have a potential pediatric role because they allow vessel growth and do not need eventual surgical removal. The progression of stenosis seen within stents 7 to 10 years after stenting has been attributed, at least in part, to inflammation around metallic struts, which might argue for an absorbable stent.

Although the concept of bioabsorbable stents has created interest for >20 years, there are challenges in making a stent that has sufficient radial strength for an appropriate duration, that does not have unduly thick struts, that can be a drug delivery vehicle, and where degradation does not generate an unacceptable inflammatory response.We will review the different bioabsorbable stents that have been studied clinically .

Igaki-Tamai Bioabsorbable Stent

The Igaki-Tamai stent (Igaki Medical Planning Company, Kyoto, Japan), the first absorbable stent implanted in humans, is constructed from poly-L-lactic acid (PLLA).In the absorption process, hydrolysis of bonds between repeating lactide units produces lactic acid that enters the Krebs cycle and is metabolized to carbon dioxide and water. The stent design is a zig-zag helical coil with straight bridges (Figure 1). Strut thickness is larger than that in contemporary metallic stents at 170 µm, and vessel coverage by stent struts (24%) is greater than that with contemporary metallic stents . As PLLA is radiolucent, gold markers at each end provide radio-opacity for stent identification. The stent does not release an antiproliferative drug. Absorption is by bulk erosion, where absorption occurs throughout the mass of the implant and not just at the surface. This allows the stent strut to retain its shape until absorption is well advanced. This stent is important in the history of PCI with absorbable stents.

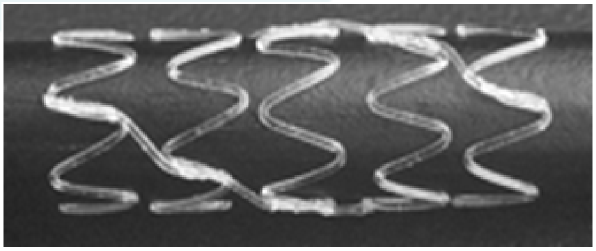

Figure 1.

A Bioabsorbable Magnesium Stent

The first metallic bioabsorbable stent implanted in humans is the magnesium alloy stent studied in the Clinical Performance and Angiographic Results of Coronary Stenting with Absorbable Metal Stents trial.This stent, laser cut from tubular magnesium WE-43 (Biotronik, Berlin, Germany), has sinusoidal in-phase hoops linked by straight bridges (Figure 2). It is balloon expandable, with strut thickness of 165 µm, and the 3-mm stent has a crossing profile of 1.2 mm compatible with a 6F guide catheter The coverage of arterial wall by the expanded stent is similar to that of the conventional metallic stents (10%).The radial strength at implantation is similar to that of stainless steel stents.As the stent is radiolucent and does not have radio-opaque markers, accurate postdilatation and additional stent placement without gaps or long overlap may be a challenge. Absorption is by surface erosion, such that strut thickness decreases as the stent is absorbed.

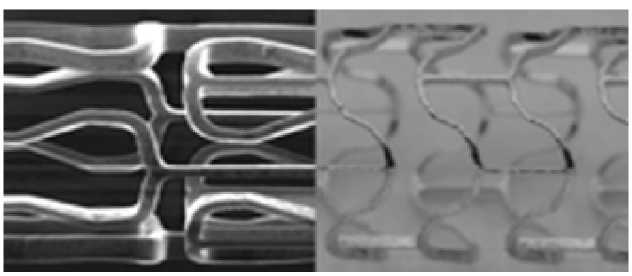

Figure 2

The Clinical Performance and Angiographic Results of Coronary Stenting with Absorbable Metal Stents trial is a prospective, nonrandomized study where 71 magnesium stents, 10 to 15 mm in length, were implanted in 63 patients with simple de novo native coronary artery lesions.The immediate angiographic results were similar to those after deployment of other metallic stents. Although the stent was completely absorbed within 2 months, radial support was lost much earlier so that, perhaps within days, there was an insufficient radial strength to counter the early negative remodeling forces after PCI.In addition, it did not release an antiproliferative drug to counter the intimal hyperplastic response to stenting. Consequently, there was a high restenosis rate at 4 months of almost 50% and target vessel revascularization at 1 year was 45%. There were no deaths, myocardial infarctions, or stent thromboses, and the stent was no longer detectable by intravascular ultrasound (IVUS). Although the authors concluded that the magnesium stent could be safely degraded by 4 months, the high restenosis rate may raise concerns about safety. Newer designs explore prolongation of radial support and potential for drug coating.

BVS Everolimus-Eluting Bioabsorbable PLLA Stent

The BVS everolimus-eluting stent (Abbott Vascular, Santa Clara, Calif) is the first bioabsorbable stent to have clinical and imaging outcomes similar to those following metallic drug-eluting stent (DES) implantation for 2 years but with the potential advantages of full-stent absorption. This stent has a bioabsorbable polymer backbone of PLLA with a polymer coating of poly-D,L-lactide that contains and controls the release of the antiproliferative drug, everolimus. PLLA is approved for use in hundreds of clinical situations ranging from absorbable sutures, orthopedic plates, and screws and was the polymer used in the Igaki-Tamai stent trial where it was shown to be safe in human coronary arteries.

The chemical structure and metabolism of the PLLA used in the BVS stent are the same as used for the Igaki-Tamai stent, but different methods of polymer processing result in different physical behaviors. The same poly-D,L-lactide coating polymer and antiproliferative drug that coated a metallic stent were safe and effective in the FUTURE trials. The release rate of everolimus from the BVS stent (80% by 30 days) is similar to that from the permanent polymer on the metallic Xience V stent used in the Spirit trials. Polymeric strut absorption is by bulk erosion.

The design of the BVS stent revision 1.0 used in cohort A of the Absorb trial is circumferential out-of-phase zig-zag hoops, strut thickness 150 µm, linked either directly or by straight bridges (Figure 3A).Revision 1.1 to be used for cohort B of the Absorb trial is constructed from the same polymer material but different methods of processing increase duration of radial support to months but retain the same total absorption time of ≈2 years Although strut thickness is unchanged, the new design has circumferential in-phase zig-zag hoops linked by straight bridges reminiscent of the original Multi-Link design (Figure 3B). For both revisions, the expanded stent covers 25% of the vessel wall. Revision 1.1 provides more uniform vessel wall support and drug application. In addition, it can be stored at room temperature rather than under refrigeration. Stent security has been increased, and therefore, stent dislodgement will be unlikely. Both stent designs have 2 adjacent platinum radio-opaque markers at each end.

These are clearly visible on fluoroscopy and easily differentiated from calcium by their roundness and high radio-opacity. They facilitate precise postdilatation and additional stent placement because stent ends can be accurately located

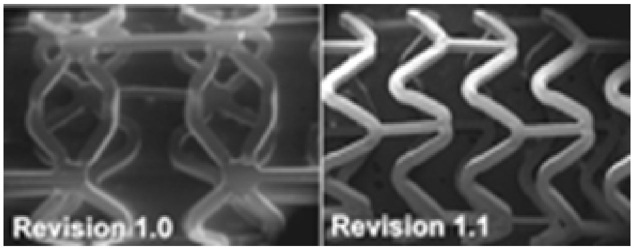

Figure 3. The expanded bioabsorbable BVS stent revisions 1.0 and 1.1.

The acute performance of the BVS bioabsorbable stent is similar to that of some metallic stents. The strut thickness and the crossing profile of 1.4 mm are similar to those of the Cypher stent (Cordis, a Johnson & Johnson Company, Miami,). Immediate recoil was similar to that of a cobalt chromium stent.Radial strength, measured in a water bath at 37°C by recording with IVUS the cross-sectional area changes occurring with incremental pressure increase was in the same order as that of a Multi-Link stent. Although the Multi-Link stent had relatively low radial strength compared with other metal stents, clinical outcomes were very good even with long stents.

In cohort A of the Absorb first-in-man trial, 3-mm diameter BVS stents either 12 mm or 18 mm in length were implanted in 30 patients with simple, de novo, native coronary artery stenoses. The procedure was a success in all 30 patients, and there was successful delivery of the BVS device in 94% (29 of 31 attempts). In 2 patients, the BVS stent became dislodged—in the first patient, the device was successfully retrieved and a new BVS was implanted without complications, and in the second patient, the BVS stent was implanted in a nontarget lesion and Cypher stents were implanted in the target lesion.The device was safe for 2 years with only 1 ischemia-driven major adverse event, which was a non-Q myocardial infarction. Interestingly, although at 6 months IVUS revealed no vessel shrinkage (no change in the area within the external elastic lamina), there was reduction of 11% to 12% in the stent area.This, in addition to intimal hyperplastic tissue, resulted in a 16.8% reduction in luminal area.

The angiographic late loss of 0.44 mm was similar to that of some metallic DES. Although the stent shrinkage raised concerns, the stent had performed its mechanical function of resisting the negative remodeling, which is the main cause of restenosis after balloon angioplasty.1 The antiproliferative drug constrained any excessive healing response; the area obstruction within the stent on IVUS of 5.54% was similar to the ≈8% observed for the everolimus-eluting Xience V arm at 6 months in the Spirit first trial.A fascinating finding is that between 6 months and 2 years there was an enlargement of the lumen detected by imaging with IVUS and optical coherence tomography, although there was no change in the angiographic late loss. In addition, other remarkable findings in the small number of patients tested are the vasoconstriction induced by methylergonovine maleate and vasodilatation induced by nitroglycerin in the "stented" segment. This vasoactivity is possible because, with stent absorption, the vessel is no longer splinted by a rigid cage. It raises the possibility of return of a physiological response to vasoactive stimuli, such as exercise and the potential for the artery to dilate in response to local ischemia. It raises the hope that after stent absorption there is a healed vessel that is normally functioning.

REVA Bioabsorbable Stent

The REVA (Reva Medical Inc, San Diego, Calif) stent is constructed from an absorbable tyrosine-derived polycarbonate polymer that metabolizes to amino acids, ethanol, and carbon dioxide. The absorption time can be modified. It is balloon expandable with a slide and lock (ratchet) design that allows stent expansion without material deformation (Figure 4). Radio-opacity is provided by impregnation with iodine. Its struts are thick (200 μm), and when balloon mounted its crossing profile is 1.7 mm requiring a 7F guide. When expanded, the stent to artery ratio is 55%. The RESORB first-in-man trial with a non–drug-eluting version was a prospective, nonrandomized single arm safety study that enrolled 27 patients. The primary end points were major adverse events for 30 days and secondary end points were quantitative coronary angiographic and IVUS parameters for 6 months. At 30 days, there were 2 patients who had experienced a Q-wave myocardial infarction and 1 had target lesion revascularization..

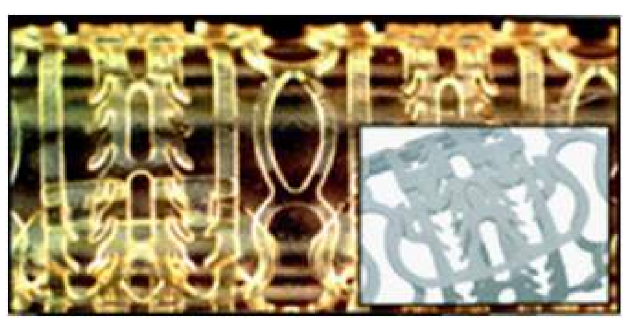

Figure 4.The expanded REVA stent.

Bioabsorbable Therapeutics Stent

The bioabsorbable therapeutics stent (Bioabsorbable Therapeutics Inc, Menlo Park, Calif), a fully bioabsorbablesirolimus-eluting stent that also releases salicylic acid, has a polymer backbone that gives the stent the physical structure and a polymer coating that contains and controls the release of the antiproliferative agent (Figure 5).

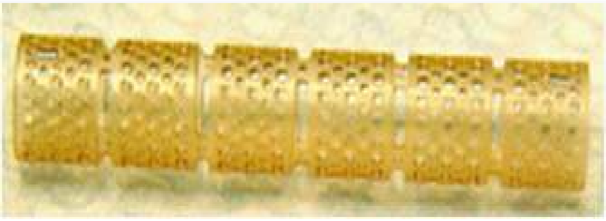

Figure 5.

The structure of the coating polymer is repeating salicylate molecules linked by adipic acid molecules. The stent backbone polymer structure is also repeating salicylate molecules but joined by different linker molecules. During absorption, the bonds between salicylic acid and linker molecules are hydrolyzed releasing the anti-inflammatory drug, salicylic acid. This anti-inflammatory agent is expected to counter the inflammation associated with PCI and with polymer degradation. Sirolimus is dissolved in the coating polymer that is applied to the abluminal surface of the stent backbone releasing the antiproliferative drug at a rate and dose similar to that of Cypher stents. Absorption of the stent, expected to be complete within 6 to 12 months, is by surface erosion.In the first-in-man Whisper trial, a stent with strut thickness of 200 μm and a crossing profile of 2.0 mm with a stent-to-artery coverage of 65% was implanted in 8 patients. Because of higher-than-expected intimal hyperplasia, a subsequent design iteration will have thinner struts, a higher dose of sirolimus, and a lower percent wall coverage.

Will Bioabsorbable Stents Eliminate the Risk of Late Thrombosis at the PCI Site?

An ideal DES would have no risk of late thrombosis and a fully bioabsorbable drug-eluting stent may fulfill this hope. Primary thrombosis at the treated site almost never occurred late after balloon angioplasty and has been described as the bane of stenting from the very beginning. Although multiple factors predispose to late thrombosis, it is reasonable to hope that it will be rare if a stent is completely absorbed because there would be no permanent metallic or polymeric foreign body exposed to blood even if endothelialization were functionally abnormal, delayed, or incomplete.If stent struts disappear, there can be no late stent malapposition. If the stent struts and coating are completely absorbed and the drug gone, there may be none of the ongoing chronic inflammation known to predispose to thrombosis.

When the bioabsorbable coating of a metallic DES has been absorbed, all that remains is a BMS, and so the risk of late thrombosis may be limited to that of a BMS. However, even BMS have an ongoing risk of thrombosis that may be improved if there were no permanent foreign body in the vessel wall.

Summary

An ideal stent should furnish best acute outcomes after PCI by sealing intimal flaps and optimizing lumen size. It should control restenosis by limiting negative remodeling and by controlling excessive healing by delivery of an antiproliferative drug. Beyond 6 months, a permanent implant has no useful function and has possible disadvantages including the potential for late thrombosis.

The concept of a stent that does its job and disappears has appeal. A number of different materials ranging from magnesium to a variety of polymers have been used to construct stents of different designs. Some of these are being tested in clinical trials. The best outcomes to date have been with the BVS everolimus-eluting PLLA stent where in the Absorb trial. Indeed, there is a suggestion of luminal enlargement between 6 months and 2 years, return of vasomotion, and endothelial function. These findings need to be confirmed in larger trials in more complex lesions. A hope is that a healed, normally functioning vessel free of foreign body and restenosis will be free of the risk of late thrombosis. Time will tell if this dream will come true.

DEPARTMENT ACTIVITIES

Pharmacy Week Celebrations

- We celebrated 53rd National Pharmacy Week on 26th, 27th, 28 November 2014.
- In connection with this event, Oushadha Vijnan 2014 was conducted successfully which was organized by Kerala Drug Control Department, Indian Pharmaceutical Association Kerala Branch, Kerala Pharmacy Graduates Association and St. James College of Pharmaceutical Sciences.
- Department of Pharmacy Practice Students has actively participated in exhibition by demonstrating counseling aids like different types of inhalers, insulin pen and patient information leaflets to the public by setting up DIC model.
- The most distinguished dignitaries of the day were: Dr. M.K.C Nair (Honorable Vice Chancellor, Kerala University of Health Sciences, Thrissur), Mr. B. Rajan (President, Kerala State Pharmacy Council), Rev. Fr. Paul A Ambooken (Director St.James Hospital, Chalakudy), Mr. M.R Pradeep (Deputy Drugs Controller, Kerala State), Rev. Dr. Jojo Antony Thoduparambil (Associate Director, SJCOPS Chalakudy), Prof. Dr. K. Krishnakumar (Secretary IPA-Kerala State Branch and Kerala Pharmacy Graduate Associate, principal SJCOPS, Chalakudy).
- Lectures on various topics were delivered by eminent personalities.
- 12 senior pharmacists was being honored including Alexander N S, A K Chandrasekharan, P K Harikumar, Jmbunathan T A, M Kanakaraj, Mathew Kokad, Mohandas V, A Padmanabhan, Prasadh, L Sasidhara Shenoi, M K Unnikrishnan Panicker, S S Vernkatakrishnan.
- Indian Pharmaceutical Association (IPA)-Community Pharmacy Division (CPD) Convention for Practicing Pharmacist was conducted on Oct 12 2014 in St. James Medical Academy
- Our M Pharm students actively participated in medical camp conducted by of St. James Medical Academy in association with Indian Oil Corporation and Lions club on October 2014 at Athirapilly.
- Our pharm d students have actively participated in national pulse polio immunization programme which was held on 18 jan 2015

- Dr Milap C Nehta

- Manipal

Patient counselling

Well trained pharmacist provided counselling to selected in-patients and out-patients thus improving medication adherences and therapeutic outcome especially in conditions like Diabetes Mellitus,Peptic ulcer,Asthma and Hypertention.

Patient Counseling Data Analysis

WARD	DIABETES MELLITUS	HYPERTENSION	PEPTIC ULCER DISEASE	BRONCHIAL ASTHMA
GENERAL	37	29	9	9
SURGERY	21	16	10	5
GYNECOLOGY	19	15	12	2
ORTHOPAEDIC	14	13	8	1
CARDIAC	17	14	14	3

Drug Information

MECHANISM OF ACTION	INDICATION	ADVERSE DRUG REACTION	GENERAL	DOSE	INTERACTIONS
24	13	17	83	13	22

WHO Health Days

DATE	DAY
29 September 2014	World Heart Day
16 October 2014	World Osteoporosis Day
24 October 2014	World Polio Day
14 November 2014	World Diabetes Day
1 December 2014	World Aids Day
31 january 2015	World Leprosy Day
4 february 2015	World Cancer Day
12 march 2015	World Kidney Day
7 april 2015	World Health Day
25 april 2015	World Malaria Day
5 may 2015	World Asthma Day
14 june 2015	World Blood Donor Day

HIGHLIGHTS

SEMINARS & CONFERENCES

- Dr.L.Panayappan ,HOD,Department of Pharmacy Practice,received Best Pharmacist award 2014,by Indian Pharmaceutical Congress Trust.
- First year M Pharm pharmacy practice students actively participated in two days national seminar on " Recent trends in pharmaceutical nanotechnology and research " co- sponsored by Kerala State Council For Science, Technology and Environment (KSCSTE),Trivandrum which was organized by Devaki amma memorial college of pharmacy,9 th-10th October 2014.
- Mrs.Aji Varghese , Miss.Deepthy C Denny and Pharm D students actively participated in pharmacy practice module - advanced learning series - VIII gastrointestinal and liver disorders (pharmacokinetics , medication therapy management ,treatment) at Alshifa college of pharmacy Perinthalmanna jointly with IACP on Nov 5 th to 7 th 2014...
- Mr Joseph Cherian mrs bincy baby attended the preceptor training 2 day programme at JSS university mysore

- Dr Bijoy Thomas, attended one day seminar on "patient rights" at moozhikulam, on 2 february 2015
- PUBLICATIONS
- Bijoy Thomas*,Irfana , Jasmine V.L., Hanan Mary Davis, L.Panayappan , K.Krishnakumar ,.An overview of common food – drug interactions. Pharm line .2014 ;14(1):
- Treesa P Varghese*,Ruksana Faizal,Lincy George,Panayappan L,Krishnakumar K,.A Review On Role Of Cardiac Troponins In Acute Coronary Syndrome. International Journal of Pharma Sciences and Research (IJPSR).2014;5(7):420-424.
- Deepthy c Denny*, Dr k krishnakumar, Lincy George ,Dr L panayapan ,G Andhuvan. A Review on drug knowledge - a barrier to patient medication adherence..2014
- Cincy MM*, Krishnakumar K, Panayappan L, Lincy George, Dineshkumar B*A Study On Risk Categorization And Prevention Strategies In Diabetic Foot Ulcers Int J Pharm 2015; 5(2): 500-504 Issn 2249-1848
- L Panayappan*, Ivin Jayandran, Lincy George, K Krishnakumar,Timing of Pre-operative Antibiotics in Relation with Surgical Site Infections Inventi Rapid: Pharmacy Practice Vol. 2015, Issue 3,ISSN 0976-3848
- L Panayappan*, Treesa p varghese , Lincy George, K KrishnakumarA prospective study on the risk factors, angiographic severity and their correlation with STEMI and NSTEMI in patients with acute coronary syndrome, Journal of harmonized research in medical and health sci. 2(1), 2015, 01-05.

ONGOING RESEARCH

- "Prospective Study On The Effect Of Pharmacist Intervention On Health Related Quality Of Life Of Hemodialysis Patients".
- "Assesment Of Quality Of Life And Drug Utilization Evaluation In Asthma Patients"
- "Evaluation Of Dosage Regimen In Patients With Renal Impairement At A Tertiary Care Hospital"
- "Assessment Of Relative Efficacy & Safety Of Oral Anticoagulants And Pharmacist Interventions To Improve Medication Adherence"
- "Evaluation Of Drug Utilization Pattern And Non-Pharmacological Management Of Osteoarthritis"
- "Assessment And Phamacoeconomics Of Antihyperlipidemic Drugs In A Tertiary Care Hospital"
- " A Study On Risk Categorisation Of Angina Pectoris And Drug Utilization Evaluation Of Antianginal Agents"
- "Drug Utilization Evaluation Of Cephalosporin Antibiotic At A Tertiary Care Hospital"
- "Drug Utilization Evaluation Of Antimicrobials In Lower Respiratory Tract Infection In A Tertiary Care Hospital"
- "Drug Utilization Study On Antiplatelets In A Tertiary Care Hospital"
- "A Prospective Study On Prevalence Of Nosocomial Infection And The Corresponding Antiinfective Therapy In A Multispeciality Hospital"

FDA APPROVED DRUG LIST

No.	Drug Name	Active Ingredient		
1.	Kengreal	canegrelor	6/22/2015	To prevent the formation of harmful blood clots in the coronary arteries for adult patients undergoing percutaneous coronary intervention.
2.	Viberzi	eluxadoline	5/27/2015	To treat irritable bowel syndrome with diarrhea (IBS-D) in adult men and women.
3.	Kybella	deoxycholic acid	4/29/2015	To treat adults with moderate-to-severe fat below the chin, known as submental fat.
4.	Corlanor	ivabradine	4/15/2015	To reduce hospitalization from worsening heart failure.
5.	Cholbam	cholic acid	3/17/2015	To treat pediatric and adult patients with bile acid synthesis disorders due to single enzyme defects and for patients with peroxisomal disorders.
6.	Unituxin	Dinutuximab	3/10/2015	To treat pediatric patients with high-risk neuroblastoma.
7.	Cresemba capsule injection	isavuconazonium sulfate	3/6/2015	To treat adults with invasive aspergillosis and invasive mucormycosis, rare but serious infections.

8.	Avycaz	ceftazidime-avibactam	2/25/2015	To treat adults with complicated intra-abdominal infections (cIAI), in combination with metronidazole, and complicated urinary tract infections (cUTI), including kidney infections (pyelonephritis), who have limited or no alternative treatment options.
9.	Farydak	panobinostat	2/23/2015	To treat patients with multiple myeloma.
10.	Lenvima	lenvatinib	2/13/2015	To treat patients with progressive, differentiated thyroid cancer (DTC) whose disease progressed despite receiving radioactive iodine therapy (radioactive iodine refractory disease).
11.	Ibrance	palbociclib	2/3/2015	To treat advanced (metastatic) breast cancer.
12.	Natpara	parathyroid horomone	1/23/2015	To control hypocalcemia (low blood calcium levels) in patients with hypoparathyroidism.
13.	Cosentyx	secukinumab	1/21/2015	To treat adults with moderate-to-severe plaque psoriasis.
14.	Savaysa	edoxaban	1/8/2015	To reduce the risk of stroke and dangerous blood clots (systemic embolism) in patients with atrial fibrillation that is not caused by a heart valve problem.

FDA DRUG ALERTS

Sl.no	drug	indication	alert	date
1	Methyl pheni-date transdemal system	ADHD	PERMANENT LOSS OF SKIN COLOUR	24/06/2015
2	EZOGABINE	ANTI-SEIZURE	RETINAL ABNORMALITIES. POTENTIAL VISION LOSS, SKIN DISCOLOURATION ALITIES,POTENTIAL VI-SION LOSS, SKIN DISCOLOURATION	16/06/2015
3	ceftolozane and tazobactam	ANTI-BACTERIAL	MEDICATION ERROR AND DOSE CONFUSION	20/05/15
4	canagliflozin, dapagliflozin, and empagliflozin	ANTI-DIABETIC DRUG	KETOACIDOSIS	15/05/2015
5	FERUMOXYTOL	IRON DEFICIENCY ANEMIA	FATAL ALLERGIC REAC-TION WITH ANEMIA	30/03/2015
6	AMIODARONE, SOFOSBUVIR	chronic hepatitis C	SERIOUS LIVER PROB-LEM	24/03/2015
7	OLANZAPINE PAMOATE	SCHIZOPHRENIA	POST INJECTION DELIRI-UM SEDATION	23/03/2015
8	VARENICLINE	QUIT SMOKING	**potential alcohol in-teraction, rare risk of seizures, and studies of side effects on mood, behavior, or thinking**	09/03/2015
9	TESTOSTERONE	REPLACEMENT THERAPY	**HEART ATTACK ,STROKE**	03/03/2015
10	NSAID,OPIOIDS	PAIN MEDICINE DURING PREG-NANY	DEPRESSION, ANXITY	09/01/2015

DRUG PROFILE

CANGRELOR

CLASS
Antiplatelet Agents, Cardiovascular

DOSAGE FORM AND STRENGTH
Injection, lyophilized powder for reconstitution 50mg/vial

INDICATIONS AND DOSAGE
Percutaneous coronary intervention : Indicated as an adjunct to percutaneous coronary intervention (PCI) to reduce the risk of periprocedural myocardial infarction (MI), repeat coronary revascularization, and stent thrombosis (ST) in patients who have not been treated with a P2Y12 platelet inhibitor and are not being given a glycoprotein IIb/IIIa inhibitor

30 mcg/kg IV bolus infused over 1 minute before PCI, THEN

Immediately follow bolus injection with 4 mcg/kg/min IV infusion; continue for at least 2 hr or duration of PCI, whichever is longer

Paediatrics : Safety and efficacy not established

PHARMACOLOGY
Mechanism of Action: P2Y12 platelet inhibitor that blocks ADP-induced platelet activation and aggregation; it binds selectively and reversibly to the P2Y12 receptor to prevent further signaling and platelet activation

INTERACTIONS
Serious - Use Alternative

clopidogrel

prasugrel

ADVERSE EFFECTS
Bleeding, Worsening renal function in patients with CrCl <30 mL/min (3.2%), Hypersensitivity

CAUTIONS
Increased risk of bleeding; bleeding events of all severities were more common with cangrelor than with clopidogrel

Check for hypersensitivity

PREGNANCY & LACTATION
Pregnancy Category: C

Lactation: Unknown if distributed in human breast milk; use caution

ADVERSE DRUG REACTION

The following are some of the adverse drug reactions either reported to or detected by the department of pharmacy practice during the period Sep 2014-jun 2015.

Sl. No.	Drugs	Category	Route	Nature of ADR
1	Cefotum (ceftazidime)	Antibiotic	Injection	Rashes at injection site
2	progesterone	Steroid hormone	Injection	Rashes on neck
3	Mefenamic acid (meftal)	NSAID	Oral	Eruptions in palms and sole
4	Paracetamol	Analgesic	Oral	Steven Johnsons Syndrome (SJS)
5	Insulin	Antidiabetic	Injection	Hypoglycemia
6	Cefipime-Tazobactum	Antibiotic	Injection	Red colour thickening and rash with severe itching

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