



CODEN [USA]: IAJ PBB

ISSN : 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

<https://doi.org/10.5281/zenodo.17203044>Available online at: <http://www.iajps.com>

Research Article

A PROSPECTIVE OBSERVATIONAL STUDY ON UTILIZATION OF ANTI- PLATELET DRUGS IN TERTIARY CARE HOSPITAL.

Mahe Naaz Sultana¹, Syeda Rana Nikhat², Juveria Begum³, Syeda Hafsa Fatima³,
Iffath Ali³, Maimoona Amtul Manan³

¹Associate Professor, MESCO college of Pharmacy, Affiliated to Osmania university, Mustaidpura,
Karwan Road, Hyderabad, Telangana, 500006, INDIA.

²Professor, MESCO College of Pharmacy, Affiliated to Osmania University, Mustaidpura, Karwan
Road, Hyderabad, Telangana, 500006, INDIA.

³Student, MESCO College of Pharmacy, Affiliated to Osmania university, Mustaidpura, Karwan
Road, Hyderabad, Telangana, 500006, India

Abstract

Objective: Our study aims to assess the use of different antiplatelet drugs in vascular diseases. The main objectives are to evaluate the drug use pattern of antiplatelets in tertiary care hospitals and to observe the drug interactions in patients administered with antiplatelet therapy.

Methodology: It is a Prospective Observational study conducted over a period of six months in the Department of General Medicine at Osmania General Hospital. The Data was collected in a designed Data Collection, and the same Data is presented via Graphical Data Presentation (Bar Graph, Pie Chart). All patients were subjected to a complete medical history (risk factors, medications), thorough clinical examination, ECG, coronary angiography, and lab investigations.

Results: The incidence of coronary artery disease, unstable angina, NSTEMI, and stroke was found in a total number of 100 patients, out of which 37% of patients are affected by ischemic stroke, 27% are affected with CAD, 19% are affected with unstable angina, and 17% with NSTEMI. The patients in the age group of 51–70 are mostly prescribed antiplatelet drugs. Among the study population, 80% of patients are prescribed dual antiplatelet therapy (DAPT) and 20% are prescribed monotherapy. Compliance with the European Society guidelines for prescribing antiplatelet drugs in tertiary care hospitals was estimated to be 89%, and the 11% non-compliance was due to drug interactions and a lack of education.

Conclusion: In this study 100 cases of antiplatelet were recorded over a period of 6 months. As per the study conducted, the male population is predominantly with exposure to disease. Among the collected cases, it was recorded that most patients have co-morbidities such as diabetes mellitus (55%) and hypertension (45%).

Among our patient's majority were suffering from Ischemic stroke, CAD, Unstable Angina, and NSTEMI. The most commonly prescribed drugs are Aspirin (80%) and clopidogrel (20%). Dual therapy was prescribed (80%). As per the investigational reports, which were done during the treatment of the patients, these included ECG and hematological examinations.

Keywords: Ischemic heart disease, Angiography, ST elevation Myocardial infarction, Myocardial Infarction, , Coronary Artery Disease.

Corresponding author:

Mahe naaz sultana,
Associate Professor,
MESCO College Of Pharmacy,
EMAIL ID: mahenaaz99@gmail.com
mob no: 7680810890

QR CODE



Please cite this article in *press* Mahe naaz sultana et al., A prospective observational study on utilization of anti- platelet drugs in tertiary care hospital., Indo Am. J. P. Sci, 2025; 12(09).

INTRODUCTION:

Antiplatelets are a class of drugs that prevent platelets from coagulating and forming a blood clot.

In the event of an injury, platelets accumulate at the site of the injury, where they clump together to form a blood clot and hence restore homeostasis. The development of platelet clots and plugs and the formation of atheromatous plaques leading to the formation of an organized thrombus is a pathological phenomenon. This may lead to critical blockage of the lumen of the vessel involved, leading to ischemia. Similar blood clots may also form around stents, artificial heart valves, and other devices that are placed inside the heart or blood vessels. Antiplatelets help in the prevention and cessation of clot formation.

The surface of platelets contains several glycoprotein integrin receptors on their surface. When there is vascular damage, reactive proteins like the von Willebrand Factor (vWF) are exposed, and they react with GPI_a and GPI_b receptors, respectively. This causes the release of TXA₂, ADP, and 5-HT, which are proaggregatory and vasoconstrictor mediators. GPII_b/GPIII_a receptors on platelets go through a conformational change to favor the binding of fibrinogen and vWF, which induces platelet adhesion; thus, a platelet plug is formed.

In arteries, platelet aggregation is the main cause of clots, while in veins, due to sluggish blood flow, RBCs are trapped by a fibrous tail, causing clot formation. Therefore, antiplatelets are more commonly used for arterial clots, while anticoagulants are used for venous clots. ¹

Antiplatelets can be classified into four classes:

COX inhibitors, e.g., Aspirin

P2Y₁₂ Receptor Blockers

g., Clopidogrel, Prasugrel, Ticlopidine, Ticagrelor, Cangrelor

GPIIb/IIIa Inhibitors

g., Abciximab, Eptifibatide, Tirofiban

Phosphodiesterase Inhibitors/ Platelet cAMP Enhancer

g., Dipyridamole, cilostazol. ¹

COX INHIBITORS

Aspirin acts by irreversibly inactivating the enzymes COX1 and TX-synthase. When platelets are exposed to aspirin in portal circulation before it is deacetylated in the liver, during first-pass metabolism, and because platelets can't produce any enzymes on their own, the concentration of enzyme TXA₂ is decreased in the blood. Therefore, aspirin, even at a low dose of 40mg/day, has some effect on platelet aggregation. Aspirin also inhibits the synthesis of COX-1 as well as PG₂. However, these enzymes can be replenished by the vessel walls. It

is possible that at high doses (>900ml/day) all these enzymes can be suppressed, but at low doses (75-150mg/day) aspirin selectively inhibits TXA₂.

Pharmacokinetics: Aspirin is absorbed readily in the stomach when taken by the oral route. It is excreted primarily through the kidneys.

Dose: Oral Tablet 75mg, 150mg, 325mg (Ecosprin)

Side effects: High risk of Bleeding, Stomach ulcers, kidney problems, and increased risk of Asthma.

Contraindications: People with salicylate intolerance, people with NSAID intolerance, People with Kidney disease, Asthma, a history of stroke, or infectious disease in children. ²

P2Y₁₂ RECEPTOR BLOCKERS**CLOPIDOGREL:**

Clopidogrel works by blocking the P2Y₁₂ type of purinergic receptor on the surface of platelets irreversibly. Clopidogrel is safer and better tolerated than other P2Y₁₂ receptor blockers and has the same efficacy. A study has shown that it even has a slightly lower risk of stroke when compared to another common antiplatelet drug, aspirin. A combination of Aspirin and Clopidogrel is very commonly used to prevent stroke. It is a prodrug, and its active thiol form is produced after metabolism in the liver.

Pharmacokinetics: Clopidogrel is absorbed by the oral route, and metabolized in the liver. Only about 50% of ingested drugs are absorbed and only a fraction of this is slowly metabolized by the liver and the rest is destroyed by other enzymes. Therefore, it is a slow-acting drug

Dose: 300mg loading dose and then followed by 75mg/day (plavix)

Side effects: Diarrhea, epigastric pain, rashes, and high risk of bleeding.

Contraindications: It is contraindicated in patients with previous incidences of bleeding and stroke.

Interactions: Omeprazole reduces the metabolic activation of clopidogrel. It shows synergistic activity with other antiplatelets. ³

TICAGRELOR:

It is a newer P2y₁₂ receptor blocker that doesn't require activation. Its mechanism is different from others in its class; it inhibits the binding of ADP to the P2Y₁₂ receptor, which inhibits platelet aggregation. It has a faster onset of action than clopidogrel and prasugrel. The risk of intracranial bleeding is higher but other major bleeding is similar.

Pharmacokinetics: Absorbed orally, has a quicker onset of action, and has a biological t_{1/2} of 12 hours. Dose: For ACS, it is given 90mg twice daily. Loading dose is 180mg. ⁴

DIAGNOSTIC TEST

Angiography is a common medical practice that allows you to see the blood flow within your body. Diagnosing various disorders might be crucial. It also provides an opportunity to intervene and cure blockages and other anomalies, particularly those affecting the heart and brain. Learn about the reasons for angiography, techniques, side effects, difficulties, and problems, as well as the healing process.⁵

Angiography is useful for detecting blockages in the lungs (pneumonic), the heart (coronary), the cerebrum (cerebral), and other smaller veins (called microangiography). It may also detect internal bleeding (hemorrhage) and aneurysms (abnormal expansion of veins), both of which can lead to serious medical problems.

Angiography allows your medical provider to detect abnormal blood flow caused by stenosis (constriction of veins), abnormalities with the design of the heart, internal bleeding, or other tests that should be avoided. Unusual blood flow affects the organs supplied by the arteries, increasing the risk of chest pain (angina), respiratory failure, stroke, and other complications.

Aside from its obvious diagnostic function, angiography can also be used to deliver therapy. Angioplasty, for example, can be used to clear blockages and expand restricted arteries. As part of an angiography approach, it is also possible to use fixed dilators called stents to widen arteries and curve or seal aneurysms.⁶

TYPES OF ANGIOGRAPHIES

➤ CORONARY ANGIOGRAPHY

The coronary arteries are crucial to the heart's function because they deliver blood to it. Heart tests may be abnormal and particular symptoms may be present if certain vessels are restricted or obstructed, including:

Chest discomfort (angina)

Changes in heart rate and blood pressure

Pain in the jaw, neck, or arm that isn't explained

Serious medical issues, such as irregular heart rhythms (arrhythmia), heart attack (myocardial infarction), or congestive heart failure, may emerge as this progresses. Other cardiac problems that can be detected and treated by angiography include:

Congenital heart defect

Heart valve disease

Aortic stenosis

Chest injuries

An angiography procedure may be used by a healthcare professional to acquire information for therapy. Coronary angiography can assist a healthcare clinician (usually an interventional cardiologist or radiologist) in determining the cause of the issue, making a diagnosis, and determining the next steps in therapy, such as surgery, medication, or dietary modifications.⁷

➤ CEREBRAL ANGIOGRAPHY

Cerebral Angiography is a procedure that examines the blood vessels in the brain.

Cerebral angiography can also be used to visualize the blood arteries that supply the brain. The approaches are similar, but there is a longer road to go via the circulatory system to reach these locations. To improve visibility, other imaging methods may be used in conjunction with the surgery.

Cerebral angiography can be performed to alleviate narrowing that causes transient ischemic episodes or increases the risk of stroke. In the hours after that, it may be feasible to remove a clot and reverse symptoms like weakness, numbness, loss of speech, or visual problems in the hours following a stroke. Cerebral aneurysms, abnormal dilatations or bulging of blood arteries that are prone to rupture and subsequent hemorrhage, can also be sealed off.⁸

➤ MICROANGIOGRAPHY

Microangiography may be used to examine the tiny blood arteries that supply other organs, which is very useful when dealing with localized bleeding. Because quickly developing tumors are very vascular, it may also be effective in diagnosing and treating malignant tumors. A useful supplementary therapy may involve depriving tumors of their blood supply.⁹

➤ ECG

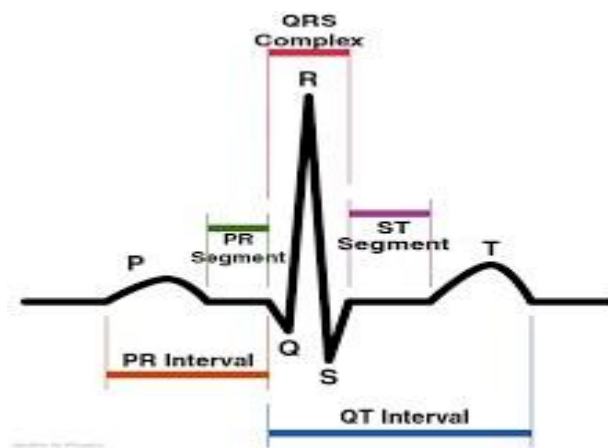
An **electrocardiogram (ECG)** is a test that detects electrical activity in the heart using sensors that are placed on the skin over the chest.

It is a quick, painless test. These tests can be done at rest or during exercise (such as walking on a treadmill) and can detect a variety of heart problems, including coronary heart disease, particularly when they are done during exercise.

The potential benefit of screening is to prevent cardiovascular events such as heart attacks, strokes, and death in people who have no symptoms of cardiovascular disease. Most of this benefit occurs in people at high risk of cardiovascular disease.

ECG is a non-invasive diagnostic modality that has a substantial clinical impact on investigating the severity of cardiovascular diseases.

Electrocardiogram machines are designed to record changes in electrical activity by drawing a trace on a moving electrocardiograph paper. The electrocardiograph moves at a speed of 25 mm/sec. Time is plotted on the x-axis and voltage on the y-axis. On the x-axis, 1 second is divided into five large squares, each representing 0.2 sec. Each large square is further divided into five small squares of 0.04 sec each. The ECG machine is calibrated in such a way that an increase of voltage by one mVolt should move the stylus by 1 cm.¹⁰



➤ **TRIPLE-RULE-OUT**

For patients with acute chest discomfort, triple-rule-out (TRO) computed tomographic (CT) angiography can offer a cost-effective examination of the coronary arteries, aorta, and pulmonary arteries.

- Poorly functioning valves in your leg veins, which can cause blood or other fluids to pool in your legs (venous insufficiency)
- Heart valve defects and congenital heart disease
- A blocked artery (arterial occlusion)
- Decreased blood circulation in your legs (peripheral artery disease)
- Bulging arteries (aneurysms)
- Narrowing coronary syndrome (ACS), whose symptoms may also be attributable to acute pathologic abnormalities of the aorta or pulmonary arteries. Although a normal cardiac rhythm remains a significant element in coronary CT picture quality, modern CT scanners with 64 or more detector rows offer quick electrocardiographically (ECG) gated imaging to give high-quality TRO CT examinations in patients with a heart rate of up to 80 beats per minute.

➤ **PLATELET COUNT**

Platelets, sometimes called thrombocytes, are tiny blood cells that help blood clot. After a trauma, the process of clotting aids in the stoppage of bleeding. Platelet counts and platelet function tests are the two types of platelet testing available.

The quantity of platelets in your blood is counted in a platelet count test. Thrombocytopenia is defined as a lower-than-normal platelet count. After a cut or other type of bleeding injury, this condition might cause you to bleed excessively. Thrombocytosis is defined as a higher-than-normal platelet count. This may cause your blood to clot faster than it should. Because blood clots can restrict blood flow, they are harmful.

Platelet function tests look at how well your platelets can clot. The following tests are performed on platelets to determine their function:

Closure time: The time it takes platelets from a blood sample to fill a small hole in a tiny tube is

measured in this test. It can aid in the detection of certain platelet diseases.

Viscoelastometry: A blood clot's strength is measured as it develops in this technique. To halt bleeding, a blood clot must be powerful.

Platelet aggregometry: is a technique for measuring the number of platelets in the blood. This is a set of assays that assesses how strongly platelets adhere to one another (aggregate).

Lumi aggregometry: When specific compounds are introduced to a blood sample, this test evaluates how much light is created. It can assist in determining if the platelets have any flaws.

Flow cytometry: is a technique that measures the number of cells in a sample. Lasers are used in this experiment. It can aid in the detection of hereditary platelet abnormalities. This is a highly specialized examination. It's exclusively available at a few hospitals and research labs.¹¹

INDICATION

➤ If your platelet count is lower than normal (thrombocytopenia), it might mean one of the following:

Leukemia and lymphoma are examples of cancers that affect the blood. Hepatitis and measles are examples of viral infections.

It's an autoimmune disorder. This is a condition in which the body attacks its healthy tissues, including platelets.

Infection of the bone marrow or injury to the bone marrow
 o Cirrhosis
 o Deficiency of vitamin B12
 o Gestational thrombocytopenia is a low-platelet disorder that affects pregnant women. It is not known to damage a pregnant woman or her unborn child. During pregnancy or after birth, it normally improves on its own.

➤ If your platelet count is greater than usual (thrombocytosis), it might mean one of the following:

Lung cancer and breast cancer are two examples of cancers. Anaemia

Inflammatory bowel disease (IBD) is a kind of bowel illness
 o Rheumatoid arthritis is a kind of arthritis that affects the joints.

A bacterial or viral infection.¹¹

METHODOLOGY:

STUDY DESIGN:

A prospective observational study.

STUDY LOCATION:

The study was conducted at Osmania General Hospital, a tertiary care teaching hospital.

STUDY POPULATION:

All patients were admitted to the Department of General Medicine at Osmania General Hospital.

STUDY DURATION: 6 months,
SAMPLE SIZE: 100 cases.

SELECTION CRITERIA:**INCLUSION CRITERIA:**

Patients over 18 years of age.
All patients were diagnosed with clot-forming ailments.
Patients on antiplatelet therapy.

EXCLUSION CRITERIA:

Patients under 18 years of age.
Pregnant women, lactating mothers, and patients on prescription without antiplatelet drugs.

Obtain history and relevant demographic information: Record demographic information; obtain past medical history, including a specific history of cardiovascular diseases.

Obtain all the relevant clinical laboratory data: Record current laboratory information (e.g., Troponin levels, C.B.P., etc)

Obtain relevant radiological data: It includes angiographic reports, E.C.G., and 2D echo.

Review current medications: Identify drugs for which individualization of the treatment regimen will be necessary.

Evaluation and analysis of the collected data.

RESULTS:**1. GENDER-WISE DISTRIBUTION**

Among the study population of 100 patients, 55 are male (55%), and 45 are female (45%).

GENDER	Number of patients	Percentage
MALE	55	55
FEMALE	45	45

2.AGE DISTRIBUTION

Among the study population, the age ranged from 30-80 years; the age was categorized into groups such as 31–40, 41–50, In this, there were 10 patients (10%) in 31–40, 17 patients (31–40%) in 41–50, 30 patients (30%) in 51–60, 24 patients (24%) in 61–70, and 19 patients (19%) in 71–80.

AGE GROUP	Number of patients	percentage
31-40	10	10
41-50	17	17
51-60	30	30
61-70	24	24
71-80	19	19

3. INDICATION-BASED SEGREGATION:

In the study population, antiplatelet therapy was prescribed for patients with indications such as ischemic stroke, unstable angina, coronary heart disease, and non-elevated heart disease.

Indication	Number of patients	Percentage
NSTEMI	17	17
CAD	27	27
Ischemic stroke	37	37
unstable angina	19	19

4. BASED ON CO-MORBID CONDITIONS

In the study population, i.e., the patients using antiplatelet therapy, comorbid conditions such as diabetes mellitus (55%), and hypertension (45%) are present.

Comorbid conditions	Frequency	percentage
Diabetes mellitus	55	55
Hypertension	45	45

5. MOST PRESCRIBED ANTI-PLATELET AGENT:

In the study population, aspirin and clopidogrel were the most widely used antiplatelet agents. Aspirin was prescribed for 80% of the study population, and clopidogrel was prescribed for 20% in combination therapy with aspirin.

Drug	Frequency	Percentage
Aspirin	80	80
Clopidogrel	20	20

6. SOCIAL HABITS:

Among the study population, 40% of patients with antiplatelet agents have a habit of smoking, and 35% are alcoholics.

Habit	Frequency	Percentage
Smoker	40	40
Non-smoker	25	25
Alcoholic	35	35

7. UTILIZATION PATTERN OF ANTI-PLATELET AGENT:

Among the study population, aspirin and clopidogrel combinations were prescribed, i.e., dual therapy for 88%, and aspirin alone was prescribed for 12% as monotherapy.

Therapy	Frequency	Percentage
Mono therapy	12	12
Dual therapy	88	88

DRUG INTERACTIONS:

The majority of the drug interaction in the prescription is due to dual therapy of Antiplatelet agents i.e. aspirin (96%) and clopidogrel (96%), where this combination is prescribed weighing benefit over risk. And other

S.NO.	INTERACTIONS	FREQUENCY	PERCENTAGE
1.	Ibuprofen	3	3
2.	Omeprazole	1	1
3.	Clopidogrel	96	96
4.	Aspirin	96	96

interactions are due to Ibuprofen (3%) and Omeprazole (1%).

DISCUSSION:

In the present study, we have performed a prospective observational study on the utilization of antiplatelet drugs in tertiary care hospitals. Evidence of different types of antiplatelet drugs was observed in 100 patients, of which 55 were male and 45 were female.

Drug use evaluation of antiplatelets shows that aspirin along with clopidogrel may provide benefits over either drug prescribed alone. Among the study population (37%), are diagnosed with ischemic heart disease. Among the study population, Diabetes

Mellitus (55%) and Hypertension (45%) are the major comorbidities associated with the patients prescribed antiplatelet drugs.

Patients in the age groups of 51–70 are mostly prescribed antiplatelet drugs. Among the study population, 80 patients were prescribed a single antiplatelet drug, and 20 patients were prescribed clopidogrel.

According to European society guidelines, prescribing antiplatelet drugs in tertiary care hospitals was estimated to be 89%. Patients with ischemic stroke, CAD, unstable angina, and

NSTEMI are prescribed DAPT for 12 months, followed by monotherapy.

According to Pramodh et al.¹³, 89% of patients received dual therapy, while 11% were prescribed monotherapy. Whereas this study concludes that 88% of dual therapy and 12% of monotherapy. This study is similar to the Pramodh et al.¹³ study.

According to Rajesh Hadia et al.¹², 51.1%, while monotherapy was prescribed at 45.4%. Whereas this study concludes that 88% of dual therapy and 12% of monotherapy. This study is dissimilar to the Rajesh Hadia et al.¹² study.

CONCLUSION:

- In this study of 100 cases of antiplatelets was recorded over a period of 6 months. As per the study conducted, the male population is predominantly exposed to disease.
- Among the collected cases, it was recorded that most patients have co-morbidities such as diabetes mellitus (55%) and hypertension (45%).
- Among our patients, the majority were suffering from ischemic stroke, CAD, unstable angina, and NSTEMI. The most commonly prescribed drugs are aspirin (80%) and clopidogrel (20%). Dual therapy was prescribed (80%).
- As per the investigational reports that were done during the treatment of the patients, there were ECGs and hematological examinations.

Role of clinical pharmacists in providing DUE for antiplatelets:

- The pharmacist can assist in educating patients on the risk factors, etiology, and signs and symptoms of cardiac disorders. Should use their knowledge about antiplatelet drugs used in the treatment of complex patient cases in the hospital setting from admission to discharge and promote the rational use of drug therapy.

REFERENCES:

1. Cohen H, et al. How I treat the co-occurrence of venous and arterial thrombosis. *Blood*. 2024;143(23):2351-62. Available from: <https://ashpublications.org/blood/article/143/23/2351/514987/How-I-treat-the-co-occurrence-of-venous-and>
2. Arif H, Aggarwal S. Salicylic acid (aspirin). In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2025 Aug 23]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK519032/>
3. U.S. Food and Drug Administration. Plavix (clopidogrel) prescribing information. Silver Spring (MD): FDA; 2022. Available from: https://www.accessdata.fda.gov/drugsatfda_docs/label/2022/020839s0781bl.pdf
4. U.S. Food and Drug Administration. Brilinta (ticagrelor) prescribing information. Silver Spring (MD): FDA; 2024. Available from: https://www.accessdata.fda.gov/drugsatfda_docs/label/2024/022433s0371bl.pdf
5. Omeh DJ, Tonogai I. Angiography. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2025 Aug 23]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557477/>
6. Tavakol M, Ashraf S, Brener SJ. Risks and complications of coronary angiography. *Am J Cardiol*. 2012;110(10):1438-46. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC4777042/>
7. Principles of angiography: types, applications, benefits and risk factors. *J Cont Med Edu*. 2023. Available from: <https://www.jcmedu.org/jcmedu-articles/principles-of-angiography-types-applications-benefits-and-risks-factors-100755.html>
8. Omeh DJ, Tonogai I. Angiography. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2025 Aug 23]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557477/>
9. Omeh DJ, Tonogai I. Angiography. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2025 Aug 23]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557477/>
10. Sattar Y, Ullah W. Electrocardiogram. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2025 Aug 23]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK549803/>
11. Paniccia R, Priora R, Liotta AA. Platelet function tests: a comparative review. *Platelets*. 2015;26(4):1-15. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC4340464/>
12. Hadia R, Shah P, Johncy S, et al. Antiplatelet agents utilization pattern and assessment of patient-specific drug use problems among cardiac patients. *J Pharm Res Int*. 2021;33(33B):142-52. Available from: <https://journaljpri.com/index.php/JPRI/article/view/2620>
13. M. Ashok Kumar, Dr. P. Shanmugasundaram, Pramodh B, et al.(2017)."A prospective observational study on drug use evaluation of anti-platelet agents in tertiary care hospital".

Indian journal of pharmacy and technology.year
2017,volume 10,issue 12. Available from:
[https://rjptonline.org/AbstractView.aspx?PID=
2017-10-12-44](https://rjptonline.org/AbstractView.aspx?PID=2017-10-12-44)