

**MANAGEMENT OF ARTERIOSCLEROSIS IN
UNITED STATES**

By

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CERTIFICATE

This is to certify that the work reported in the Integrated M. Tech. thesis entitled **“Management of Arteriosclerosis in United States”**, submitted by **SaritaBhawanani (141833)** at **Jaypee University of Information Technology, Wagnaghat, India**, is a bonafide record of their original work carried out under my supervision. This work has not been submitted elsewhere for any other degree or diploma.

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ABSTRACT

The current study has an objective to get perspective of vascular surgeons of United States on catheter navigation system by ultrasound beacon to be used to treat low permeability Arteriosclerosis using catheter procedure. Thickening, hardening, and elasticity loss in blood vessels is caused by Arteriosclerosis. This development progressively restricts the blood flow to one's organs and tissues and may direct to severe diseases/health risks brought on by arteriosclerosis that could be a specific variety of coronary-artery disease caused by the buildup of fatty plaques, sterol, and a few alternative substances around the walls of blood vessels. For this study different vascular surgeons of United States were contacted. Surveys were conducted via CATI. The data was collected, analyzed and summarized. The transcripts were presented to the client which consist of compiled and organized data which was gathered through CATI and secondary research.

CHAPTER 1

INTRODUCTION

1. INTRODUCTION

1.1 Arteriosclerosis/Atherosclerosis

Atherosclerosis is a disease within your arteries where plaque builds up. Plaque is a sticky substance found in the blood that consists of saturated or trans fat, “bad” cholesterol which is LDL, calcium, and other substances. Over time, the plaque will make arteries hard and narrow. This limits oxygen-rich blood flow to the tissues.

Atherosclerosis can direct to the development of severe problems, like the following:

Coronary artery disease:Arteries provide blood to the most vital organ which is heart, after they are blocked, an individual will suffer angina or a coronary failure.

Peri-pheral arterial disease:These supply routes are available in your arms, legs and pelvis. An individual can experience the ill effects of deadness, torment, and once in a while diseases when they are blocked.

Carotid artery disease These conduits give cerebrum blood. An individual can endure a stroke when they are blocked.

Atherosclerosis does not typically cause manifestations until a supply route is seriously limited or totally blocked. Numerous individuals don't understand it that they have it until they have a medicinal crisis. There are different ways like a physical test, X-ray imaging to detect atherosclerosis in an individual. Prescriptions can direct the advancement of plaque improvement. Specialists may similarly suggest for angioplasty, or therapeutic strategy on the coronary or carotid corridors. There are some non-surgical methods which can also improve this condition. The non-surgical methods include routine exercise, healthy diet, stopping smoking etc.

1.2 Market Research

Market research is an efficient method of collecting information about any new product, services or may be even about company profile. It is helpful to depict future trends and business

expansion. It is used for the analysis of the market and to draw come to a decision which are then used in strategizing further business.

There are two components or ways of doing Market Research:

Primary Research: It consists of straight or direct communication with target respondent to get their perspective. There are various ways of doing it. So, it can be done by any following ways: “face to face interviews, telephonic interviews, online surveys or panel interviews.” There are different ways of conducting interviews; one of the ways is “CATI” (Computer aided telephonic Interview) and “IDI” (In-Depth Interviews) to gather information and opinions from people. It is also known as field research.

“Unimrkt research mainly uses CATI form of primary research to gather information from the target audience.”

Secondary Research: It involves collecting data from secondary sources such as “market reports, guidelines, research papers, and case studies etc.” which are already accessible to the large number of people. It is also called desk research.

1.3About the technology-X:

The technology was created to spot the position of the tip of the catheter in a vein utilizing a little ultrasonic transmitter in real time echo imaging. The aim of this innovation is to abbreviate the time of treatment and diminish x-ray exposure while carrying out the intravascular catheter treatment.

A little ultrasonic transmitter is appended to the tip of the catheter, and its position is distinguished continuously with an ultrasonic diagnostic device like reverberation (Echo capturing machine is a medicinal gadget that visualize a cross section of a body by picturing reflection (reverberation) from tissue utilizing ultrasonic waves).

CHAPTER 2

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

2.1 Arteriosclerosis

Clotting and toughening of the walls of arteries is known as **Arteriosclerosis**. This phenomenon takes place when the blood vessel, which is used to transport nutrients from heart to different body organs, becomes thick. This results in limiting the flow of blood to different body parts. Over the certain period of time, the walls of arteries get toughen and this progression is called as “**hardening-of the arteries.**”

“**Atherosclerosis**” is a sort of arteriosclerosis, because of which terms utilized are some of the time compatible. Gathering of plaque around the blood vessel results in the narrowing and solidifying of veins and this state is known as Atherosclerosis.

Arteriosclerosis obliterans is an “occlusive arterial disease” mainly affecting the aorta of the abdomen and the varied sized arteries of the lower limbs.

The job of carrying blood from the heart to other body parts is done by arteries. The presence of layer of cells over the walls of arteries ensures the smooth flow of blood. This is called the endothelium. Harmed endothelium results in atherosclerosis, which is harmed by the layering of cholesterol around the walls of the blood vessels. White platelet is sent by the body to tidy up this cholesterol, and eventually, the cells get stuck at the influenced site. This outcomes in structure up of plaque, which is mainly composed of cholesterol, phagocytes, calcium, and other components present and can get accumulated in the blood. The plaque develops to a certain size and stop developing further, this condition is not that harmful. But sometimes, the plaque obstructs the blood vessel, disrupting the progression of blood around the body. This outcome is a hazardous condition since blood clumps. At times, the plaque eventually, tears open. Platelets can stick together, if this occur, it leads to the clumping of the blood. This can hinder the supply route, prompting perilous issues, like a stroke or heart assault. This issue can cause coronary

illness, strokes, dissemination issues in the arms and legs, aneurysms that can cause perilous inward draining and endless kidney ailment.

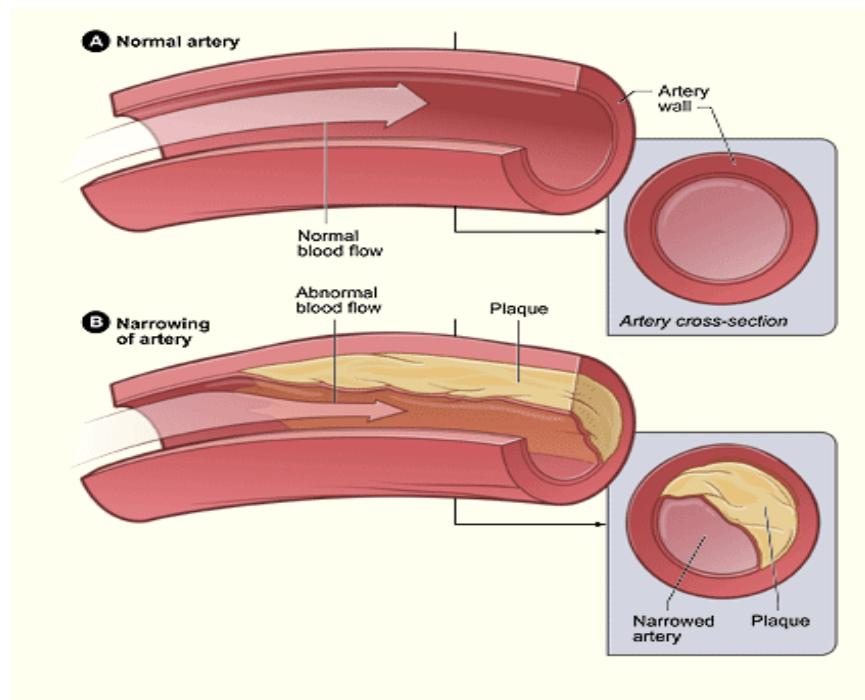


Figure 2.1 Fig-A shows a normal blood stream. The supplement picture exhibits a cross-sectional area of a typical blood vessels. Fig-B depicts development of plaque inside blood vessel. The supplement picture demonstrates a cross-segment of a course with plaque development.

Ref: NIH USA

2.2 Epidemiology and Prevalence

- There are studies demonstrating that coronary atherosclerosis starts developing at a young age and that lesions are present in 1 of 6 teenagers. Even though patients with coronary artery disease usually become symptomatic after age 40 years, necropsy studies have showed that atherosclerotic changes in the blood vessels wall begin early in life. (Tuzcu et al, 2001)

- Approximately 610,000 people die each year from heart disease in the U.S. – that is 1 in 4 deaths.
- In both male and female, coronary heart disease is the major reason of death. In the year 2009, over portion of the passing were from coronary illness happened in men.
- Coronary heart disease (CHD) is the he most well-known sort of coronary illness that causes deaths in excess of 365,000 individuals.
- Approximately more than 700,000 Americans endure a heart assault each year.

2.3 Atherosclerosis-Related Diseases

Any vein can be influenced in the body because of Atherosclerosis, in addition to courses in the heart, mind, fore and hind limbs, pelvic girdle, and kidneys. This can result in various maladies dependent on which veins are influenced.

Ischemic Heart Disease

The phenomenon wherein blood vessel or the arteries can't provide enough oxygenated blood to “the tissues of the heart” when it is required amid times because of pressure or physical exertion is known as “Ischemic heart disease.”

Coronary illness, is a kind of ischemic heart illness only. There is a plaque development in coronary artery which eventually leads to incapability of artery to provide fully oxygenated blood. An individual may have angina (chest pain or distress) or a heart assault, if the oxygen supply through blood stream to the heart muscle is decreased. There is another disease called Coronary micro-vascular infection which is just like coronary heart illness. It happens when the heart's little supply routes don't work typically.

Carotid Artery Disease

On the off chance that plaque is developed on each side of the carotid supply routes, problem in Carotid artery happens. Oxygen-rich blood to your cerebrum is provided by these conduits. One may have a stroke, if blood circulation to the mind is decreased or blocked.

Peripheral Artery Disease

If plaque develops in the blood vessels that supply oxygenated blood to for limbs and hind limbs, and to pelvic girdle. This condition is referred as Peripheral artery disease. In this condition also, circulation of the blood to these regions of the body is decreased or blocked. Symptoms like numbness, torment, pain can be observed.

Chronic Kidney Disease

Development of the plaque in the renal blood stream, chronic kidney disease can happen. To kidneys oxygenated blood is provided by these renal blood vessels. With the progression of time CKD causes a moderate loss of work of kidneys. This hinders the major function of the kidney which is evacuation of excessive salts and water from the body.

2.4 Causes

The exact reason for the occurrence of atherosclerosis is not clear or understood. There is a study which depict that atherosclerosis is a complex malady which can be severe or moderate that may start growing in adolescence.

When certain variables start harming the endothelium or the internal layers of the veins, arteriosclerosis start developing. These elements majorly include- “High amounts of specific fats and cholesterol in the blood,smoking,increased level of blood sugar because of insulin obstruction or diabetes,and high circulatory strain.”

2.5 Risks Factors

The reason behind arteriosclerosis is not that clearly evident. Certain characters, circumstances, or propensities may increase the chances for the infection. These conditions are known as hazard factors or risk factors. The more hazard factors an individual have the more probable it is that, that individual may develop arteriosclerosis. Following are the major risk factors:

- **“Unhealthy blood cholesterol levels”**: Includes high LDL often called "bad" cholesterol and low HDL, called "good" cholesterol.
- **“High pulse”**: Hypertension is featured as 130/180 mmHg or more on the off chance that an individual has diabetes or kidney disease.
- **“Smoking”**: Smoking can bring about crushing of blood streams;can increases cholesterol levels and raise circulatory strain.
- **“Insulin resistance”**: Insulin opposition happens if the body can't utilize its insulin appropriately
- **“Diabetes”**: In diabetic patients, glucose level is so high that the pancreas doesn't make enough insulin or doesn't utilize its insulin appropriately in order to normalize the blood glucose level.
- **“Overweight or stoutness”**: The expressions "overweight" and "heftiness" allude to body weight that is more noteworthy than what is viewed as healthy.
- **“Lack of physical action”**: An absence of physical action can intensify other hazard factors which may lead to atherosclerosis, for example, undesirable or increase in blood cholesterol levels, hypertension, diabetes mellitus, and obesity.
- **“Unhealthy diet”**: An inadequate eating regimen like food having high salt, trans-fat, sugar can raise the risk of the development of atherosclerosis.
- **“Older age”**:Risk for atherosclerosis raises, as an individual gets older. The two major factors responsible for theplaque development as individual ages are an individual’s genes and his lifestyle
- **“Family history of early coronary illness”**:Chances of arteriosclerosis increases in an individual if an individual has parents who developed arteriosclerosis in course of their life.

2.6 Signs and Symptoms

Most of the time no arteriosclerosis symptoms are observed even when artery wall steadily thickens and harden. Even as the condition declines into atherosclerosis, gentle cases may not demonstrate any indications. That is the reason normal check-ups are significant.

The signs and symptoms depend on the kind of artery is affected due to arteriosclerosis. The major arteries and manifestations are as follows:

Carotid arteries

Carotid arteries take oxygenated blood to the cerebrum. A range of symptoms can be observed in an individual in which plaque has started developing in their carotid artery. Some of the indications are “Sudden shortcoming, paralysis, confusion, trouble speaking and understanding of the speech, breathing problems, trouble in seeing from one or both eyes, dizziness, sudden and extreme cerebral pain, trouble in walking, loss in balance and coordination, confusion etc.”

Coronary arteries

Coronary artery is the main supplier of blood to the heart. Chest agony could be a side effect of atherosclerosis influencing the flow of blood in coronary supply routes. It can cause angina and heart assault, when the blood supply to the heart is limited. Manifestations include – “Vomiting, extreme anxiety, chest torment, coughing, feeling faint.”

Renal arteries

Blood vessels that delivers oxygen-rich blood to the kidneys are renal arteries. If the blood supplies restricted in the kidneys because of plaque formation, there is a genuine risk of occurring chronic kidney disease (CKD). The main signs often observed in an individual having renal blockage includes “loss of hunger, swelling of the hands and feet, difficulty in concentrating.”

2.7 Complications

The intricacies of atherosclerosis rely upon which arteries are blocked. For instance:

- **“Coronary artery illness”**: At the point when atherosclerosis restricts the blood flow in coronary artery then an individual may create CAD “coronary artery disease”, which could lead to chest torment or a heart assault.

- **“Carotid artery disease”**: A transient ischemic assault (TIA) is caused when atherosclerosis limits the flow of blood in carotid artery which supplies oxygenated blood to mind and individual may develop this disease.
- **“Peripheral artery illness”**: When atherosclerosis constricts the blood vessel and there is depletion of oxygenated blood supply in tissues of arms and legs, the condition is called peripheral artery disease. This may lead to loss of sensation and one may not feel warmth and coldness, increasing the danger of burns and frostbite. Gangrene can be developed in severe conditions.
- **“Aneurysms”**: Aneurysms can also be caused by arteriosclerosis.
- **“Chronic kidney infection”**: Atherosclerosis can cause the decrease in supply of blood to kidneys and this can lead to the deterioration in the functions of kidneys.

2.8 Diagnosis

“Physical Exam”

Physical examination may indicate frail or missing heartbeat (for example in leg or foot). Blocked artery can be detected by a missed pulse.

“Indicative or diagnostic Tests”

At least one or more tests might be obligatory to analyze atherosclerosis. Severity of disease can be estimated by these tests, which helps doctors to plan treatment.

- **“Blood Tests”**: Levels of trans fats, cholesterol, sugar, and proteins in blood can be determined by blood tests.
- **“ECG” (Electrocardiogram)**: Through ECG doctors can estimate the severity of the damaged heart brought about by chronic heart disease. Previous or current heart assaults are also indicated in this test.

- **“Chest X-Ray”**: Pictures of the organs inside the chest like heart, veins and lungs can be taken with the X-ray. Through pictures doctors can tell if there is any indication of any heart or pulmonary disease.
- **“Echocardiography”**: The moving picture of heart can be made with the help of sound waves. Characteristics like shape, state and size of the heart and efficiency of functioning of valves and chambers can be determined with this echocardiography (reverberation).
- **“Computed Tomography Scan”**: A computer-generated photos of heart or brain can be developed by computed tomography (CT). The test can easily spot any blockage, hardening or narrowing of the blood vessels. Additionally, this test can also indicate about calcium deposition in blood vessels, in case of CHD occurrence.
- **“Angiography”**: Inside arteries can be seen by angiography which uses dye and special x-ray. Severity of the blockage can be determined. Catheter is put inside the body through arms or groin. Through catheter dye is slowly added. The dye helps to take X-ray picture. Flow of blood can easily be seen through this technique and blockages are determined.
- **“Stress test”**: Plaque constricts the arteries and eventually reduces the flow of blood. When heart is under stress condition it needs more blood and oxygen. Therefore, a stress test can give potential hints and side effects of chronic heart disease. Pictures are taken of heart when patients exercise and rests. These images taken during the tests can show how well the heart is pumping and circulating blood to various organs.
- **“Ankle/Brachial Index”**- PAD(Peripheral artery Disease) can be analyzed with this test. Hypertension in ankle is compared with blood pressure in arms in order to check the flow rate of the blood.
- **“Different Tests”**- Sometimes MRI (Magnetic resonance imaging) and PET (Position emission tomography) are done to visualize plaque formation. If these tests can give better picture of plaque.

2.9 Management and Treatment

Arteriosclerosis can be managed by both surgical and non-surgical methods. The objectives of treatment included are- “Lowering the danger of blood clumps forming, preventing atherosclerosis-related infections, reducing hazard factors with an end goal to moderate or stop

the development of plaque, relieving indications, widening or bypassing plaque-obstructed veins.”

Non- Surgical Methods

- **“Heart-Healthy Lifestyle Changes”**-It incorporates heart-smart dieting, obtaining healthy weight, managing stress, physical movement/regular exercise and stopping smoking.
- **“Drugs”**:Heart-Healthy lifestyle changes are not sufficient to control cholesterol levels. For instance, a patient additionally may require statin drugs to normalize his cholesterol. An individual can diminish his opportunity of having some kind of heartstroke, by bringing down or normalizing blood cholesterol level. Statins is usually recommended by the doctors for individuals who have- “Coronary heart illness, peripheral artery disease, or had an earlier stroke, diabetes, high LDL cholesterol levels.”
Specialists may talk about starting statin treatment with individuals who have a raised hazard for having coronary illness or having a stroke. Specialist likewise may endorse different prescriptions to- “Lower your circulatory strain, lower your glucose levels, for the prevention of blood clumps, which can prompt heart assault and stroke and for prevention of inflammation.”

Some regular prescribed drugs are:

- **“Cholesterol medication”**: Forcefully bringing down an individual’s low-density lipoprotein (LDL) cholesterol, the "bad" cholesterol. Boosting an individual’s high-thickness lipoprotein (HDL) cholesterol, the "good" cholesterol, may help, as well.
- **“Anti-platelet medication”**: Doctors may endorse anti-platelet drugs, for example, headache medicine, aspirin, to lessen the probability that platelets will clump in blood vessel and cause additional blockage.
- **“Beta blocker meds”**- These meds are normally utilized for coronary artery sickness. They bring down your pulse and circulatory strain, decreasing the pressure on heart and

frequently calm manifestations of chest torment. Beta blockers lessen the danger of heart assaults and some other cardiac issues.

- **“Angiotensin-converting enzymes (ACE) inhibitors”**- These meds may help moderate the movement of atherosclerosis by bringing down pulse and creating other gainful impacts on the heart veins. ACE inhibitors can likewise diminish the danger of repetitive heart assaults.
- **“Calcium channel blockers”**- These meds lower circulatory strain and are once in a while used to treat angina.
- **“Water pills (diuretics)”**- Hypertension is a noteworthy hazard factor for atherosclerosis. Diuretics lower the hypertension.

Surgical Methods

If there should arise an occurrence of serious atherosclerosis, therapeutic methodology or medical procedure might be required.

- **“Percutaneous coronary intervention (PCI)”**: otherwise called “coronary angioplasty”, is a strategy that is utilized to open blocked or constricted blood vessel of heart. Improvement in blood stream to the heart and ease chest torment can be achieved by this strategy. In some cases, a stent is set in the artery to keep it open after the procedure.
- **“Coronary artery bypass grafting(CABG)”**- is a sort of medical procedure. In CABG, blood vessel from different region in an individual’s body are utilized to sidestep or bypass constricted or narrowed coronary blood vessel.
- **“Carotid endarterectomy”**:It is a sort of medical procedure to take out the plaque development from the carotid blood vessel in the neck. This technique reestablishes blood stream to the cerebrum, which can help counteract a stroke and other risks.
- **“Angioplasty and stent arrangement”**: In this methodology, specialist embeds a long, catheter into the blocked artery. A second catheter with a deflated balloon on its tip is

then gone through the catheter to the narrowed area. Deposition against the artery wall is compressed when balloon is expanded at the targeted area. A stent is normally left in the artery to keep the artery open.

- **“Fibrinolytic treatment”**: If an individual has an artery that is obstructed by a blood coagulation, a doctor may utilize a coagulation dissolving medication to break it separated in order to normalize the blood flow.

2.10 Prevention

Averting the improvement of atherosclerosis is a standout amongst the most ideal approaches to treat the condition. While some hazard factors like age and heredity can't be controlled, there are ways you can avoid arteriosclerosis:

Accept your drugs as endorsed: If you have hypertension, elevated cholesterol or diabetes, be sure to accept your recommended meds as coordinated

- **“Diet”**: Avoid trans or saturated fats, they tend to increase bad cholesterol in blood. The accompanying nourishments are rich in unsaturated fats and can help keep bad cholesterol levels down. High sources of unsaturated fats are- “olive oil, avocados, walnuts, nuts, fish oil, flax seeds etc.”
- **“Exercise”**: Exercise will lower down the high blood pressure, will keep an individual fit, reduce obesity, and maintains healthy heart.
- **“Quit smoking”**: Smoking is a significant hazard factors for atherosclerosis, and it likewise leads to hypertension. So, smokers should stop smoking since it is injurious to health in so many ways.

2.11 Market Research

Statistical surveying contains intentionally collecting data about people or organizations, a market, and a short time later researching it to more readily comprehend the need of that gathering of individuals. The eventual outcomes of statistical surveying, which are commonly

compressed in a report, are then used to enable business people to settle on choices about the association's strategies, exercises, and potential customer base.

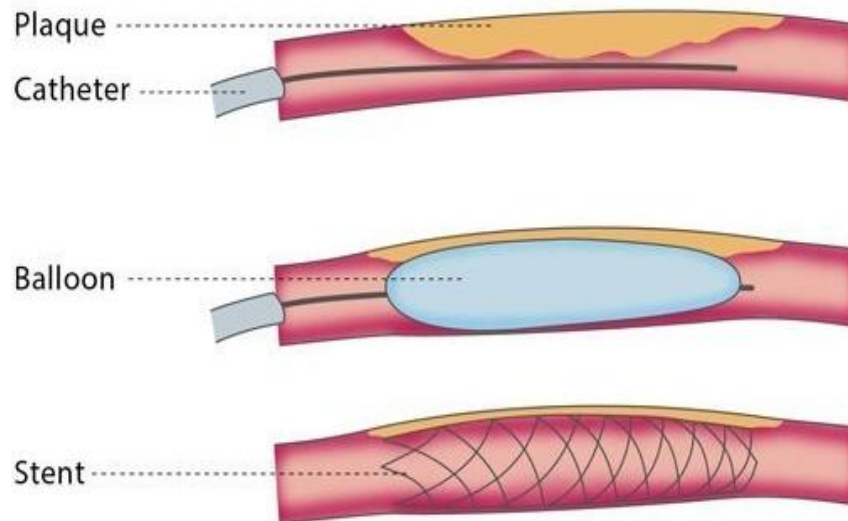
Understanding industry shifts, changing customers' needs and tendencies, and authoritative examples, notwithstanding different things, can shape where a business focuses its endeavors and resources. That is the estimation of factual studying.

There are two fundamental sorts of factual studying that associations lead to accumulate the hugest information on their things: primary research and secondary research.

Primary research: Primary research is the mission of firsthand information on your market and its customers. It incorporates going directly to a source for the most part clients in target market to pose inquiries and assemble data. Instances of primary research include “Interviews (phone or up close and personal), surveys, questionnaires, focus group, visit to competitors’ location.”

Secondary research: Secondary information is prior open data, for instance, the data shared in magazines and papers, government or industry reports. One can separate the data in new ways; anyway, the information is open to a huge number of people. The data has just been organized, collected, sorted out and dispersed by others. A great deal of secondary research is available appropriate on the Web/Internet, one can just acquire data by entering catchphrases and expressions for the kind of data one looks for.

Peripheral vascular interventions for lower limb occlusions Arteriosclerosis Obliterans (ASO)



2.12 Current treatment methods:

1. Current catheter treatment is performed mainly by X-ray contrast while monitoring the position of the lesion in the blood vessels and the position of the tip of the catheter.

Issue: It is difficult to detect some lesions such as completely obstructive lesions and there is high radiation exposure.

2. Another method used is catheter treatment which substitutes part of X-ray photography with echo photography.

Issue: The range that can be monitored by echo is narrow making it difficult to detect the tip position of the catheter guide wire (a wire for carrying a medical device such as a catheter to a diseased part).

These issues have led to high re-intervention/ re-surgical rates.

3. **New Proposed Solution:** The new technology made it easier to deal with lesions (since the contrast agent does not pass through completely obstructive lesion and the blood vessel can't be visually recognized by X-ray contrast) which were difficult to detect with X-rays, thus shortening of treatment time and reducing x-ray exposures.

Product Features include:

1. **Small ultrasonic transmitter attachable to the tip of small diameter guide wire for medical treatment** -- Through this transmitter, ultrasonic waves are generated in the wide-angle direction, making it easy to detect the position by echo. The diameter of the guide wire used is 0.45 mm allowing the generated ultrasonic signal strength to be maintained.
2. **A signal detection algorithm capable of detecting the direction and the position of the guide wire tip position over a wide range in real time echo.**

CHAPTER 3

METHODOLOGY

Market Research

Marketing research can give a business various thoughts of what sorts of new items and administrations may convey a benefit to the association. For merchandise and enterprises available, market research can tell associations whether they are satisfying their customers' needs and wants. By investigating the reactions to express request, business visionaries can understand whether they need to change their bundle plan or change their vehicle techniques or whether they should consider offering additional administrations.

It is an efficient strategy of social occasion, inspecting and disentangling information about the objective market, clients, contenders and the business by and large. For different reasons, business at various phases of development conducts market research. Various ways how organizations can utilize market research:

To decide the attainability of another business: If market research exhibits there's for all intents and purposes zero enthusiasm for the thing or organization, the business is likely not going to succeed.

To keep close tabs on marketing designs and make frameworks on the most capable strategy to stay on the ball or acclimate to changing financial circumstances.

To test enthusiasm for new items or attributes.

To choose perfect item position – how, when and where should a thing enter the market.

To improve and upgrade their business – recognizing issues with certain business points of view, for instance, customer organization early, empowers associations to overcome extravagant interferences later.

To upgrade the achievement of their special battles: By estimating customer thought and perceiving how their image is seen, associations can almost certain shape their stamping and marketing methodology.

For this study market research was done through CATI.

- Database having contact numbers of vascular surgeons of U.S. was prepared through secondary research.
- Main data source for the preparation of this database was healthgrades which helped to distinguish vascular surgeons located in different geography.
- Different doctors were contacted.
- Appointments were set with the doctors to conduct In-depth interviews.
- On scheduled time the doctors were telephoned and IDI was conducted through CATI.

Few IDI questions asked were:

- How many patients does doctor treat a typical year regardless of condition?
 - How many Arteriosclerosis patients does doctor treat in a year?
 - How many Arteriosclerosis patients undergo surgical treatment using catheter?
 - What is the proportion of arteriosclerosis patients undergo repeat surgery?
 - What are the treatment options for the patients with arteriosclerosis? How are they decided?
 - What are the current treatment gaps/ unmet needs?
 - What is the reimbursement rate for treating arteriosclerosis?
 - What is the overall impression about the product-x? Will you use this product?
- The responses of the doctors were analyzed and summarized in a form of transcripts.

CHAPTER 4

RESULTS AND DISCUSSION

Results and Discussion

- Survey was conducted with 15 vascular surgeons of U.S. through primary research.
- About 60% of the doctors that we contacted through primary had positive percept regarding this product-X.
- Theoretically, they all believed that this new technology can reduce the rate of re-intervention. However, they asked for more clinical data, trial data and real-world evidence data.

Some verbatim supporting the study are:

“I would probably have to try it first and see how it works or how efficient and effective it is. Post these basic assessments, I can make a judgment over the cost.” Vascular surgeon- 1

*“Provide me some database supporting usage of the product if it states good then of course yes. We are always open to using new improved technology.”*Vascular surgeon-2

*“I cannot comment much on the disadvantages as it is not in the market yet, we need significant data on this.”*Vascular surgeon -3

Advantages of the product-X:

- The biggest advantages would be decrease of use of X-ray radiation and the dye.
- No additional sonographer required during the surgery.
- This new technology can reduce the rate of re-intervention.
- More efficient, thus shortening of treatment time.

Challenges/Disadvantages of the product:

- Lack of more clinical data, real world evidence data.

- If it's going to meet the description provided by the company.
- Time taken to get comfortable with the new technology.
- Risks associated with the product.
- High Cost associated with the beacon tip catheter technology and would it be covered within any reimbursement policy is another challenge
- Initially, experienced and qualified professionals are needed to train the physicians.
- Trust and Acceptance associated with the physicians and patients who are already using current treatment. They might not go for the new technique

Summary

Arteriosclerosis can emerge when veins grow thick and solid and confine blood stream to tissues in the body. This relentless procedure, otherwise called solidifying of the supply routes, decays veins and can create in various organs, most generally the heart. Primary research (field research) includes assembling new information or data that has not been collected previously. Like reviews utilizing surveys or meets with gatherings of individuals in target group of onlookers. Secondary research (work area research) includes condensing existing information that has just been delivered. The real treatment strategies to treat arteriosclerosis are counseling the board without the requirement for any intercession/medical procedure and careful techniques. Another idea is proposed for the headway of the catheter route framework in which a little ultrasonic transmitter is annexed to the tip of the catheter, and its position is recognized persistently with a ultrasonic demonstrative gadget like resonance. The new innovation is by all accounts promising by 60% specialists in U.S. since hypothetically it appears efficient to manage injuries which were hard to identify with X-beams, subsequently shortening time of treatment and lessening x-beam exposures. Headway in arthrosclerosis imaging innovation and research has conveyed an assortment of indicative apparatuses to envision high-chance plaque in vivo; be that as it may, these huge vascular imaging techniques additionally guarantee incredible logical and translational applications past this journey.

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