World Journal of Pharmaceutical and Life Sciences

www.wjpls.org

Impact Factor: 7.409 Coden USA: WJPLA7

A REVIEW ON THE EXPLORING NATURAL TREATMENT WITH TRADITIONAL TREATMENT OF MOYAMOYA DISEASE

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How to cite this Article: *1Pranjali C. Jibhakate, 2Vijay P. Chaudhari, 3Vishal C. Ramteke, 4Achal H. Raghute, 5Adeshkumar S. Meshram (2025). A Review On The Exploring Natural Treatment With Traditional Treatment Of Moyamoya Disease. World Journal of Pharmaceutical and Life Science, 11(12), 102–109.

Article Received on 03/11/2025 **Article Revised on 23/11/2025** **Article Published on 01/12/2025**

1. ABSTRACT

A progressive cerebrovascular condition called moyamoya disease is characterized by stenosis or occlusion at the terminal portion of the internal carotid arteries and the formation of fragile collateral vessels, frequently referred to as a "puff of "smoke" on angiography. A writing team of professionals was chosen to do a linterature search, give a summary of what is known about the subject now and a plan for future research. Moyamoya illness is a rare, progressive cerebrovascular condition that is the disease primarily affects patients with stenosis of the vascular branches of the internal carotoid artery and the formation of aberrant, fragile collateral vessels with a usually progressive course and symptoms of either cerebral ischemia or cerebral hemorrhage. Adult moyamoya syndrome and disease are uncommon diseases with high rates of mortality and morbidity. Its clinical and radiographical identification has extended worldwide, even if it was first identified in Japan in the late 1950s.

KEYWORDS: cerebral revascularization, intracranial arterial diseases, cerebrovascular diseases, Moyamoya illness, and cerebral arterial diseases.

2. INTRODUCTION

Although the first Japanese literary account of moyamoya disease appeared in 1957, the term “moyamoya disease” was not used until 1969 by Suzuki and Takaku. Moyamoya disease is a Apersistent, isolated, and often bilateral vasculopathy of unknown origin that causes a gradual constriction of the distal intracranial segment of the internal carotid artery (ICA) and circle of Willis.[14]

Progressive stenosis or occlusion of the intracranial internal carotid artery is a characteristic of the non-atherosclerotic structural arterial abnormality known as moyamoya disease (MMD), a chronic occlusive cerebrovascular condition. (ICAs) and their proximal branches, with aberrant development of collateral arteries known as rete mirabile. While the stenotic-occlusive alterations in MMD are usually bilateral, the diagnosis is not ruled out by unilateral involvement.[3]

Beginning in the distal internal carotid and proximal portions of the anterior and middle cerebral arteries, Moyamoya disease is a cerebrovascular illness characterized by narrowing or stenosis. The term "Moyamoya syndrome" refers to a condition that is brought about by an olegemic state that has a similar appearance but has different underlying causes.

The Japanese word for something fuzzy, like puffs of cigarette smoke floating in the air, is MOYAMOYA. Takaku, Suzuki, and others reported on moyamoya illness in Japan in the 1960s1,5. Moyamoya disease is an uncommon vascular (blood vessel) ailment characterized by restricted blood flow. A blockade or narrowing of the carotid artery in the skull limits access to the brain.[1] The pathophysiology of MMS and MMD is complicated, including a wide variety of interacting genetic, molecular, and environmental variables. Radiation exposure has a strong link to MMS, as do a number of

well-known related illnesses such sickle cell disease, Down syndrome, and neurofibromatosis. 5 Among the circulating angiogenic factors are Growth factors and cytokines have been linked to moyamoya. 16,17 Genome-wide association studies (GWAS) have revealed a significant correlation between mutations in the RNF213 gene and MMD. 18, 19 further genetic research has shown that variations in RNF213 are linked to an increased risk of MMD. Changes in RAS, MAPK, NOTCH, and other genes have been linked to MMD.

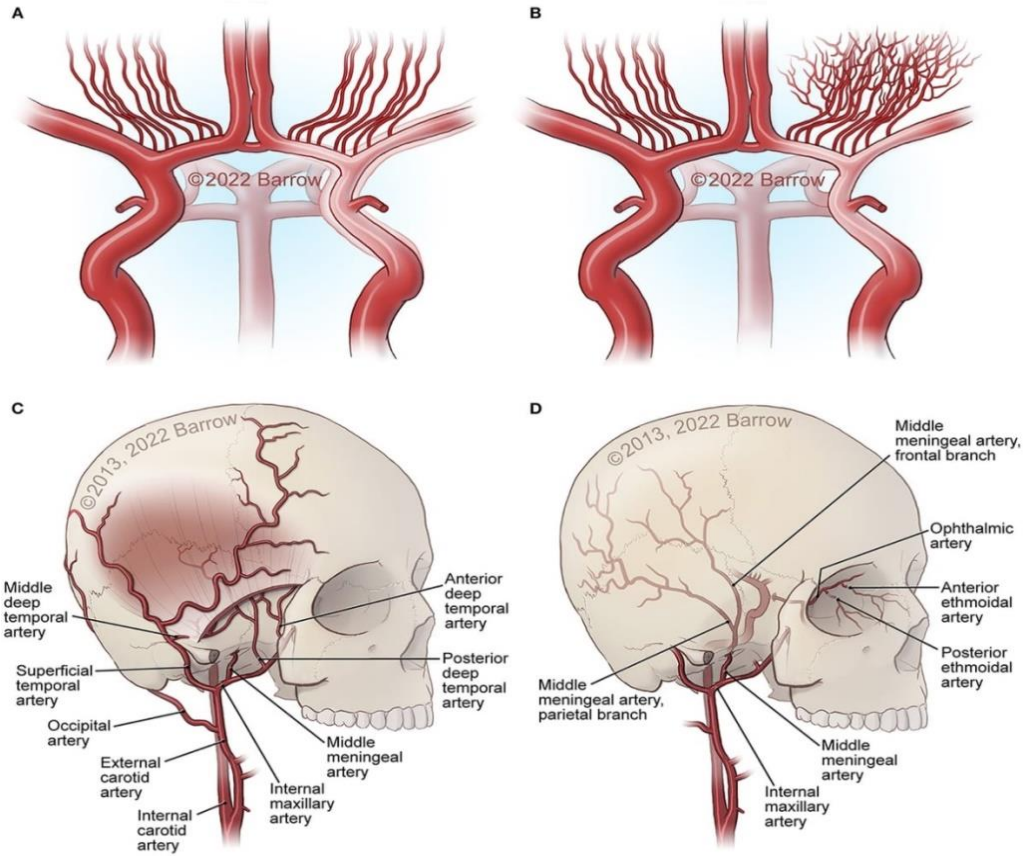

Fig No: 01 moyamoya disease brain.

3. Etiology

The exact cause of moyamoya disease is not fully understood, but its etiology can be classified as.

1. Inherited conditions

- Grave's disease
- Neurofibromatosis type 1
- Down Syndrome
- Sickle cell disease or trait
- Noonan syndrome
- Systemic lupus erythematous

2. Acquired conditions

- Pneumococcal meningitis
- Skull base tumor
- Head or neck irradiation
- Tuberculosis
- Cerebral vasculitis
- Arteriosclerosis
- Atherosclerosis of skull base[14]

4. Stages of moyamoya disease

Moyamoya disease is progressive. That means it will gradually get worse with out treatment. healthcare providers use the Suzuki"stages to describe the severity of the disease. they'll use the MRA test to help determine what stage of the disease you're in Suzuki stages include.[7] [15]

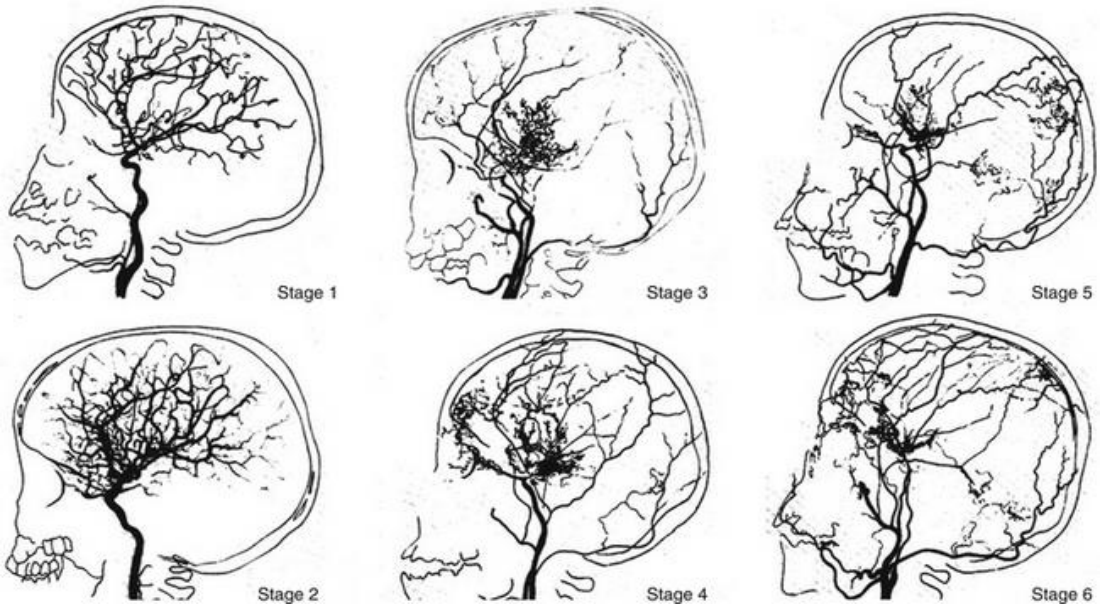

Fig.no.02 Stages of moyamoya disease.

Stage 1- Narrowing of carotid fork: The narrowing or blockage is only affecting the internal part of your carotid artery.

Stage 2—Initiation and appearance of basal moyamoya vessels: The narrowing is affecting all the terminal branches of your internal carotid artery, and deep moyamoya blood vessels are starting to become visible on the angiogram.

Stage 3—Intensification of basal moyamoya vessels: The deep moyamoya blood vessels are intensified on the angiogram, and the "puff of smoke" appearance can be seen.

Stage 4 — Minimization of basal moyamoya vessels: On the angiogram, the deep moyamoya blood vessels start to regress. Other blood vessels called transdural collateral vessels start to appear.

Stage 5 — Reduction of moyamoya vessels: On the angiogram, the deep moyamoya blood vessels continue to regress, and more transdural collateral vessels begin to appear.

Stage 6 — Disappearance of moyamoya vessels: All the deep moyamoya blood vessels have vanished, and there's a complete narrowing or blockage of the internal carotid artery.

6. Epidemiology

The prevalence of MMD varies significantly by region, with a high prevalence in East Asia and a low prevalence elsewhere. Prior research has indicated that the incidence rate of MMD in Japan is 0. 94 cases per 100,000 persons, while the prevalence is 10. 5 cases per 100,000 people. The incidence rate in South Korea is unknown, although the prevalence is known. The incidence rate is 2. 3 per 1,00,000 people, while the rate is 16. 1 per 1,00,000. In other areas, such as North America, the incidence of MMD was as low as 0. 09/1,00,000 people, but in the United States, it has been on the rise. Between 2000 and 2007, the rate of MMD in Nanjing, China, was 3. 92 cases per 1,00,000 people. Since 1976, there have been 2,430 documented instances of MMD in China, according to the most recent research.[3]

The age of start of MMD varies considerably worldwide, with a bimodal peak dominated by a major peak in the first ten years. Geographic differences in sex distribution have been noted, along with a moderate peak in the late 20s and 30s of note. According to reports, women in foreign populations have a higher incidence of MMD, with the ratio of men to women ranging from 1:1. 8. In China, the gender ratio is 1:1, but in the United States, it is 1:2:2.[3]

7. Pathology

Numerous variables are believed to contribute to the development of moyamoya disease.

1) Fibroblast growth factor: thought to be a potential mediator of the angiogenic response. The pathophysiology of the illness may include CSF-BFGF.

2) Transformative Growth Factor: This condition also saw an increase in TGF beta 1, a factor that promotes angiogenesis and the expression of genes in connective tissue.

3) Undiscovered Cerebrospinal Fluid Protein: This protein is present in some individuals who have moyamoya disease. The molecular basis of moyamoya illness may be revealed through more investigation of this protein.

4) The Function of Prostaglandins: Studies have examined the involvement of prostaglandins in the etiology of this illness. According to these research, inflammation causes moyamoya Cox2 arterial smooth muscle cells to become activated and release too much PGE.

5) Potential Role of Prostaglandins: Although the evidence is still ambiguous, some studies have hypothesized a connection between prostaglandins and

Epstein-Barr virus infection, which may be a possible pathophysiology.

6) Epstein-Barr Virus Infection: The elevated levels of EBV DNA and antibodies in hospitalized moyamoya patients served as the basis for this diagnosis.

When comparable data is associated to the underlying illness, the Moyamoya type change is employed. The word has lately been questioned, and it has been suggested that "systemic disease with angiographic" be used in place of "Moyamoya syndrome." It could keep going until we have an explanation for "Moyamoya."[1] [11]

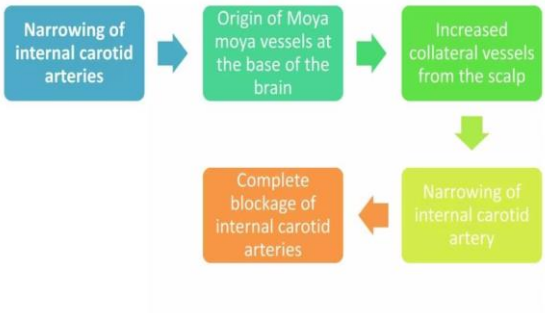

Fig. no. 03 Progression of the disease.

8. Pathophysiology

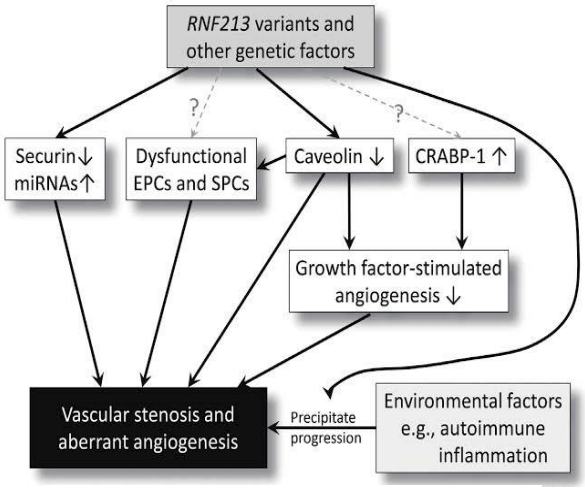

Fig.no.03 Mechanism of moyamoya disease.

In East Asian nations, genetic predisposition is hypothesized, but the underlying cause of moyamoya illness is still unknown. Ring Finger Protein is a well-known susceptibility gene that is common in patients of Japanese and Korean descent. The homozygous form of this gene has proven to forecast an earlier start and a more severe manifestation.[10]

The Midwestern United States population was found to have an unusually high prevalence of type 1 diabetes, autoimmune thyroid conditions, and other autoimmune disorders in a survey. discovered in the moyamoya group, which may indicate an autoimmune relationship. In the Western Chinese population, 31% of individuals with moyamoya disease also had an autoimmune illness, the majority of which were Graves' disease and type 1 diabetes mellitus.

An increase in proangiogenic factors, such as vascular endothelial growth factor, fibroblast growth factor, and hepatocyte, is thought to be caused by persistent brain ischemia due to stenosis. In part, the growth factor encourages the formation of a weak collateral vascular system. In addition, the link between moyamoya illness and inflammatory disease has been investigated, and inflammatory disease clusters have been found in both children and adults.[10] [12]

The literature has described the following forms of moyamoya illness with the affected chromosome.

- MYMY1 (chromosome 3p)
- MYMY2 (RNF213 gene on chromosome 17q25)
- MYMY3 (chromosome 8q23)
- MYMY4 (X-linked recessive disease defined by facial dysmorphism, short stature, hypergonadotropic hypogonadism, and moyamoya disease)
- MYMY5 (ACTA2 gene on chromosome 10q23)
- MYMY6 with achalasia (GUCY1A3 gene on chromosome 4q32)
  Additionally, alterations in the BRCC3/MTCP1 and GUCY1A3 genes have been linked to the onset of moyamoya syndrome.[10]

Pathogenesis factors include

1) The function of angiogenic factors.

• Fundamental fibroblast growth factor, which mediates the neovascular reaction.

• Converting beta factor 1 (TGF beta 1), a molecule involved in angiogenesis.

• A growth factor for hepatocytes that promotes angiogenesis.

2) Too much prostaglandin.

3) Infection: Epstein-Barr virus infection. The higher amount of EBV DNA and antibody in people with moyamoya served as the basis for this.

4) Modification of the expression of the metalloproteinase gene (remodeling).

5) This points to a malfunction in the mechanism by which the vessel wall repairs itself, resulting in prolonged primary detection in smooth muscle cells. Progressive blockage of the lumen of the vessel and term proliferation of cells.[10]

9. Sign and Symptoms

Signs and symptoms of moyamoya disease that are caused by decreased blood flor to the brain might include.[7] [11]

- Headache
- Fits
- Weakness, numbness, or paralysis in the face, arm, or leg
- Impairment of eyesight

- Problems with communication or comprehension
- Delayed development
- Uncontrollable motions
- A decline in cognitive ability
- Difficulty speaking or understanding others (aphasia).
- Forfeiture.

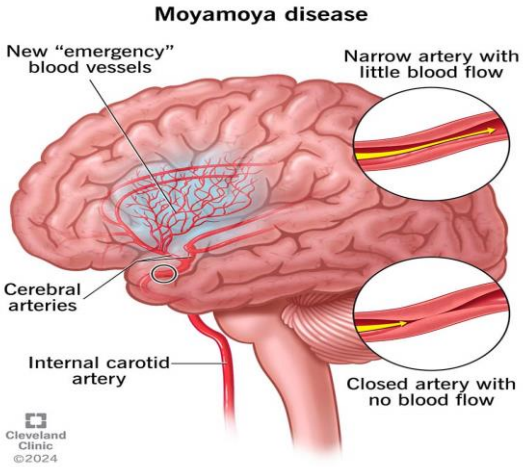

Fig.no. 04 sign and symptoms of moyamoya disease.

10. Causes of moyamoya disease

The reasons for moyamoya illness are

The precise etiology of moyamoya disease is unknown to scientists. However, the illness seems to have both genetic and environmental causes. Researchers are still looking for genes that might be inherited from biological parents. Other variables, such as inflammation or infection, could also be to blame for the illness. The term "moyamoya syndrome" or "moyamoya phenomenon" is sometimes used to describe cases of moyamoya disease that coincide with other illnesses. Examples of these other illnesses include.[7] [11] [15]

• Syndrome of Down.
• Grave's disease.
• Neurofibromatosis, type 1.
• The disease of sickle cells
• Arteriosclerosis.

11. Traditional vs. Natural Cures

When treating Moyamoya illness, patients and doctors must choose between traditional and modern methods. When considering the best way to manage Moyamoya illness, each approach has advantages and disadvantages to consider.

Benefits of Natural Therapies

There are also all-natural methods for treating Moyamoya disease. A healthy lifestyle might include things like herbal remedies, a nutritious diet, and physical activity. These procedures often lack the negative consequences of surgery. They may be included in a complete treatment regimen. Employing these organic methods may potentially reduce the need for surgical interventions.

Le t's look at the differences between old and new treatments.

Treatment Type	Key Components	Potential Risks	Advantages
Traditional Treatments	**Surgical intervention**, medications	Infection, stroke, surgical complications	High efficacy in restoring blood flow
Natural Treatments	Herbal remedies, dietary changes, physical therapy	Possible interactions with medications	Lower side effects, supportive care, holistic approach

The Natural Cure for Moyamoya Disease

Using herbal remedies, dietary changes, and exercise are all examples of all-natural approaches to treating Moyamoya illness. These methods combine alternative medicine with conventional therapies for Moyamoya while promoting general health and maintaining healthy blood vessels. Exploring Natural Treatments for Moyamoya Disease.

Herbal Supplements: Certain herbal supplements, such as anti-inflammatory herbs, can be beneficial in treating Moyamoya disease. They lessen inflammation and increase circulation. For those who have this illness, this is quite important.

Dietary Adjustments: Eating well can help combat the illness. A diet rich in nutrients promotes brain health and maintains healthy blood vessel function. It should contain foods rich in omega-3 fatty acids, antioxidants, vitamins, and anti-inflammatory plants.

Physical therapy and exercise are essential for controlling Moyamoya disease: They maintain your fitness and ensure that blood continues to flow efficiently to the brain. People with this illness can benefit from tailored exercise regimens that improve their quality of life.

Herbal treatments for Moyamoya illness

Herbal therapy is a potential treatment for Moyamoya disease. It has origins in ancient medicine and may improve symptoms and prevent new issues.

Ginkgo biloba

The ability of ginkgo biloba to enhance brain function is well recognized. Additionally, it can improve blood flow to the brain, which is beneficial for patients with Moyamoya illness. Among the advantages of Ginkgo Biloba is that it shields blood vessels. But first, speak with a doctor before taking 120–240 mg daily.

Turmeric and curcumin
Turmeric contains turmeric and curcumin, which combat inflammation. Curcumin's anti-inflammatory properties aid in lowering blood vessel edema. For Moyamoya illness, this is crucial. Curcumin is a crucial herb for maintaining a healthy heart, and taking 500 to 2,000 mg daily can be helpful.

Other Helpful Herbs
Many herbs aid in the maintenance of healthy blood vessels. Gotu Kola helps mend and fortify blood vessels, while hawthorn is beneficial for the heart. These herbs may be added to your therapy to improve the symptoms of Moyamoya illness.

Dietary Changes to Enhance Vascular Health
For individuals with Moyamoya illness, eating foods that lower inflammation is essential when looking at natural treatments for the condition. Maintaining a healthy diet can enhance blood flow and help avoid strokes. This section discusses the best foods for your blood vessels.

An Anti-Inflammatory Diet
Inflammation in your body can be reduced by eating an anti-inflammatory diet. For individuals with Moyamoya disease, it is crucial. This diet entails eating complete meals that are loaded with nutritious ingredients and avoiding harmful ingredients such as excessive sugar and unhealthy fats.

The following are some of the healthiest foods to eat on this diet.
• Vegetables and fruits, particularly those high in antioxidants
• Brown rice, quinoa, and oatmeal are examples of entire grains.
• Olive oil, nuts, and avocados are good sources of healthy fats.
• Fatty fish with omega-3 fatty acids, for example, are lean proteins.

This method of eating can reduce inflammation in your body. This could result in fewer and milder vascular issues for you Specific Nutrients and Foods.

Some nutrients are especially good for your blood vessels. Here are some important.

Nutrient	Function	Sources
Omega-3 Fatty Acids	Reduce inflammation and improve blood vessel function	Fatty fish (salmon, mackerel), flaxseeds, chia seeds
Antioxidants	Protect blood vessels from oxidative stress	Blueberries, strawberries, dark leafy greens
B Vitamins	Support vascular function and reduce homocysteine levels	Whole grains, beans, lentils, fortified cereals

12. Traditional Treatment
Healthcare practitioners assess your condition and decide the best course of treatment for you. Moyamoya disease cannot be cured with treatment. However, strokes can be prevented with treatment. The aim of therapy is to alleviate your symptoms and increase blood flow to the brain. Reducing your risk of problems is another goal of therapy. Potential problems include brain hemorrhage, ischemic stroke due to insufficient blood flow, and death.[9]

The prognosis for moyamoya disease, also known as the prognosis, depends on a variety of variables, such as.
• When the illness was discovered.
• When you seek treatment, how much harm has occurred.
• If you receive therapy or not.
• Age.
• You could receive treatment that includes-
- Medical Treatment
- Operation
-Treatment/ therapy

Medical Treatment
Drugs may be prescribed to treat symptoms, lower the chance of a stroke, or help regulate seizures. Examples of medicines include: If you have been diagnosed with moyamoya disease and have few to no symptoms, blood thinners are often recommended. To prevent strokes, your doctor may advise you to use aspirin or another blood thinner.

Calcium channel blockers, sometimes referred to as calcium antagonists, are a class of medications that can be used to treat headaches. Additionally, it could lessen the symptoms of transient ischemic attacks. In individuals with moyamoya disease, calcium channel blockers can help control blood pressure, which can help prevent harm to blood vessels.[7]

Anti-seizure drugs: These medications may be beneficial for people who have experienced seizures.

Operation/ Surgery
Early surgical treatment can help slow progression of moyamoya disease. Your neurologist may recommend revascularization surgery if you develop symptoms or strokes. Surgery also may be recommended if tests show evidence of low blood flow to your brain.

In revascularization surgery, surgeons bypass blocked arteries. They do this by connecting blood vessels on the outside of the skull to the inside of the skull to help restore blood flow to your brain. This may include direct or indirect revascularization procedures. Or it may include a combination of both.[6]

Direct revascularization procedures: In direct revascularization surgery, surgeons stitch the scalp artery directly to a brain artery. This also is known as superficial temporal artery to middle cerebral artery bypass surgery. This procedure increases blood flow to your brain immediately.

Direct bypass surgery may be difficult to perform in children due to the size of the blood vessels. But it's the preferred option in adults. This intervention can be performed safely and effectively by an experienced surgical team that treats people with moyamoya disease daily.[10]

Indirect revascularization procedures: In indirect revascularization, the goal is to increase blood flow to the brain gradually. In adults being treated in high-volume surgical centers, indirect revascularization is almost always combined with direct revascularization.

Indirect revascularization procedures include encephaloduroarteriosynangiosis. This also is called EDAS. They include encephalomyosynangiosis, also called EMS. Or they include a combination of both.

In EDAS, a surgeon makes a small temporary opening on the scalp to expose the artery. Then the surgeon makes an opening in your skull directly beneath the artery. The surgeon lays the intact scalp artery onto the surface of your brain, which allows blood vessels from the artery to grow into your brain over time. The surgeon then replaces the bone and closes the opening in your skull.

Therapy

To address the physical and mental effects of a stroke on you or your child, your healthcare professional may recommend an evaluation by a psychiatrist or therapist. Without surgery, moyamoya disease can cause cognitive decline due to narrowing blood vessels. A psychiatrist may look for signs of problems with thinking and reasoning skills. The psychiatrist also may monitor you or your child for signs that those problems are worsening.[8]

Cognitive behavioral therapy can help address emotional issues related to having moyamoya disease, such as how to cope with fears and uncertainties about future strokes.

Physical and occupational therapy can help regain any lost physical function caused by a stroke.

13. Complications

Complications that are associated with Complications that are associated with moyamoya disease include:

* Perioperative ischemic stroke
* Hemorrhagic stroke
* Hyperperfusion syndrome after direct vascularization
* New or worsening seizures
* Epidural hematoma
* Wound healing issues.

14. CONCLUSION

Moyamoya disease is a very rate disease; the above review article main aim is all information about this moyamoya disease etiology, pathophysiology, diagnosis and treatment of this rare disease which is related to the cerebrospinal fluid which present in the blood. To provide the information about moyamoya disease is shown by the above review paper**.**

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