



## Review Article

# Intradural Internal Carotid Artery Fusiform Aneurysm: A Review of Literature

Dennis Adjepong, MD, MBA\*

Department of Neurological Surgery, California Institute of Behavioral Neurosciences & Psychology, Fairfield, USA

### Abstract

An aneurysm is a localized or dilation of an artery with a diameter of at least 50% higher than the average size of an artery. Intramural internal carotid artery aneurysm is likely to occur in different locations, mostly at the intersecting point of smaller vessels, and is typically saccular. However, fusiform and blister aneurysms may also occur. The multiplicity of an aneurysm is common in patients having Internal Carotid Artery (ICA) aneurysms. For this study, the population of the fusiform aneurysm did present instances of hemorrhage; other five did present dizziness without headache while four others did present ischemia deficit and single patient with abducent nerve palsy from effects of the aneurysm. Most of the studies did indicate that the condition presents with various neurological symptoms and deeply affects quality of life.

**Keywords:** Fusiform aneurysm; Internal carotid artery; Intradural internal carotid aneurysm

### Introduction

Carotid artery fusiform aneurysm is classified according to their shape [1]. The cause of the fusiform aneurysm maybe because of the variety of underlying pathologies that affect the vessel wall [2]. Carotid artery fusiform aneurysm is not shared [3]. However, there has been an increase in cases in recent years [4]. This represents 3%-13% of all the intracranial aneurysm that is usually common in the vertebrobasilar system [5]. The anterior circulation fusiform aneurysm is not shared and occurs in the middle cerebral artery and the

\*Corresponding author: Dennis Adjepong, Department of Neurological Surgery, California Institute of Behavioral Neurosciences & Psychology, Fairfield, USA, Tel: +1 5712771998; E-mail: adjepongdennis1@gmail.com

**Citation:** Adjepong D (2020) Intradural Internal Carotid Artery Fusiform Aneurysm: A Review of Literature. J Surg Curr Trend Innov 4: 034.

**Received:** April 03, 2020; **Accepted:** May 13, 2020; **Published:** May 20, 2020

**Copyright:** © 2020 Adjepong D. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

internal carotid artery [6]. However, there have been sporadic reports of cases about the fusiform aneurysm treatment and few reports on the clinical characteristics and methods of treatment of this aneurysm in broader series [7]. The goal of treatment of this is condition is often to reduce the risk of complication [8]. These various symptoms can vary depending on what is compressed [9]. Such may however included among common facial swelling, hoarseness or the problem of swallowing. In rare cases carotid artery aneurysms can rupture and burst which life is threatening in most cases. It is worth noting that the fusiform aneurysms of cerebral arteries are less prevalent than the saccular aneurysm [10].

### Methods

The study did examine the various health journal that looks into the key elements or aspect of the disease, numerous studies were reviewed which relate the prevalence rate and other issues of the disease like the key symptoms and signs, the prognosis and the patient education which is very vital for the patients [11]. The study did examine the various studies which have been in the past present actual findings on the fusiform aneurysm [12]. The study result will be used to make a concussive discussion that will inform the same knowledge on the condition [13].

### Results

According to the review of the various journals on the disease that were considered for the study, fusiform aneurysm has included a heterogeneous population of both ruptured and unruptured fusiform aneurysm and are limited by small numbers [14]. This is regarded as the first consecutive series describing the natural history of the patients with a fusiform intramural aneurysm that distinguishes those who are atherosclerotic and those who are not [15].

Unique to this study are the findings that the risk of adverse clinical events or rupture is quite low in patients with a fusiform aneurysm. The disease is quite common in women than men; it is also common in ages above 50 years. Among 2,458 patients treated for aneurysm between 1982 and 2007, 22 were having a fusiform aneurysm, an indication that the disease is rare [16].

### Genetics

When a complete exam sequencing analysis was performed in a patient with a family history of this disease, aneurysm in various arterial beds had common risks and genetic factors [17]. The congregation of duplication with the aortic phenotype in the family showed a relationship between the repetition and aortic disease [18]. The variants in candidates' genes showed that there is likely to be a modification that contributes to the duplication 16p13.1 on the disease [19].

### Pathophysiology

Pain affects up to half of all cancer patients, and intractable pain in terminally ill patients can severely limit quality of life. The neuropathic mechanism is related to tissue damage, paraneoplastic

inflammatory mediator secretion, nerve damage, and a variety of cancer treatments. The pathophysiology is categorized according to the shape of the non-vascular and saccular aneurysm. The fusiform aneurysm is nonvascular dilations involving a short distance of the whole vessel wall and is termed cylindrical [20]. This is often caused by atherosclerosis or dissection. The fusiform aneurysm has various underlying pathologies, anatomical distributions, natural histories, and treatment. The patients often have symptoms and signs of arterial rupture, occlusion, and a mass effect [21].

### Biochemistry

Carotid artery aneurysm is uncommon and presents a therapeutic challenge to doctors [22]. A carotid artery aneurysm is often defined as the internal carotid artery dilation of the common carotid artery is more significant than the 150% of the diameter of the normal healthy artery [23]. The initial diagnosis of the carotid artery aneurysm is by duplex ultrasound imaging [24]. A computerized tomography angiography can, however, provide additional and valuable information, especially when the surgical exclusion of the aneurysm is to be considered [25]. Recently, the imaging of the vessel wall with an enhanced magnetic resonance with gadolinium was explored, which was able to add more additional information regarding aneurysm wall changes during the clinical follow-up. With patients with a growing aneurysm or related aneurysm symptoms, an open surgical repair has always been the accepted treatment [26].

### Clinical implication

Dissection has been noted to be the primary underlying cause of the fusiform aneurysm and most commonly involves the posterior circulation that is the basilar arteries and vertebral. The dissecting aneurysm can originate in any region of the anterior circulation [27]. The follow-up and treatment of the disease are based on the presence and the type of symptoms, the lesion size, and its location and the risk of accompanying intervention [28].

### Scientific analysis

The two articles which were considered in the study were *Journal of Korean Neurosurgical Society* and *AHA journals* [29]. The first article was more detailed and properly organized. The critical elements of the disorder were stipulated in the article, and this made it considerably easy to understand and simple to comprehend. The second journal was also informative. However, it did not give a piece of detailed information about the disease [30].

### The limitations of the study

The unanswered question is the therapeutic challenges, the prevalence rate among women and adults above 50 years. The main problem which most scientific studies are still aiming to find is one in which the disease has a lower prevalence among persons below the age of 50. The other unanswered question is on the element of the variation in the age prevalence associated with this condition.

### Conclusion

The non-atherosclerotic fusiform intradural aneurysm has a low risk of the adverse outcome within the first few years of diagnosis and may remain stable unless symptomatic on presentation. It is noted that high risks of treatment should be balanced. The atherosclerotic

aneurysm has the worst natural history and may always represent a different disease entity.

### References

1. Pourier VE, van Laarhoven CJHCM, Vergouwen MD, Rinkel GJ, de Borst GJ (2017) Prevalence of extracranial carotid artery aneurysms in patients with an intracranial aneurysm. *PLoS One* 12: 0187479.
2. Arnaout OM, Rahme RJ, Aoun SG, Daou MR, Batjer HH, et al. (2012) De novo large fusiform posterior circulation intracranial aneurysm presenting with subarachnoid hemorrhage 7 years after therapeutic internal carotid artery occlusion: Case report and review of the literature. *Neurosurgery* 71: 764-771.
3. Han DK, Tadros RO, Chung C, Patel A, Marin ML, et al. (2016) Endovascular Treatment of 2 Synchronous Extracranial Carotid Artery Aneurysms Using Stent-Assisted Coil Embolization and Double Bare-Metal Stenting. *Vasc Endovascular Surg* 50: 102-106.
4. Lin LM, Colby GP, Kim JE, Huang J, Tamargo RJ, et al. (2013) Immediate and follow-up results for 44 consecutive cases of small (<10 mm) internal carotid artery aneurysms treated with the pipeline embolization device. *Surg Neurol Int* 4: 114.
5. Burrows AM, Zipfel G, Lanzino G (2012) Treatment of a pediatric recurrent fusiform middle cerebral artery (MCA) aneurysm with a flow diverter. *BMJ Case Rep* 2012.
6. Yuh SJ, Alkherayf F, Lesiuk H (2013) Dolichoectasia of the vertebral basilar and internal carotid arteries: A case report and literature review. *Surg Neurol Int* 4: 153.
7. Wang L, Shi XE, Liu F, Qian H (2016) Bypass surgery to treat symptomatic fusiform dilation of the internal carotid artery following craniopharyngioma resection: report of 2 cases. *Neurosurg Focus* 41: 17.
8. Sorenson TJ, Klein JP, Rangel-Castilla L, Lanzino G (2019) Flow Diversion of an Incompletely-Treated Fusiform Middle Cerebral Artery Aneurysm: 2-Dimensional Operative Video. *Oper Neurosurg (Hagerstown)* 18: 125-126.
9. Wan KR, Kirolos RW, Lee HY, Low DC, Ng LP, et al. (2019) Giant Aneurysm Arising from Anomalous Branch of the Middle Cerebral Artery in a Pediatric Patient: Case Report and Review of the Literature. *World Neurosurg* 128: 165-168.
10. Siddiqui AH, Abla AA, Kan P, Dumont TM, Jahshan S, et al. (2012) Panacea or problem: Flow diverters in the treatment of symptomatic large or giant fusiform vertebrobasilar aneurysms. *J Neurosurg* 116: 1258-1266.
11. Jaworska K, Dolowy J, Kuśmierska M, Kuniej T, Jaźwiec P (2012) Multiple fusiform cerebral aneurysms - case report. *Pol J Radiol* 77: 50-53.
12. Shapiro M, Becske T, Riina HA, Raz E, Zumofen D, et al. (2014) Toward an endovascular internal carotid artery classification system. *AJNR Am J Neuroradiol* 35: 230-236.
13. Kimball D, Ples H, Kimball H, Miclaus GD, Matusz P, et al. (2015) Fusiform aneurysm of a persistent trigeminal artery associated with rare intracranial arterial variations and subarachnoid hemorrhage. *Surg Radiol Anat* 37: 115-118.
14. Ishishita Y, Tanikawa R, Noda K, Kubota H, Izumi N, et al. (2014) Universal extracranial-intracranial graft bypass for large or giant internal carotid aneurysms: Techniques and results in 38 consecutive patients. *World neurosurg* 82: 130-139.
15. Arnaout OM, Rahme RJ, Aoun SG, Daou MR, Batjer HH, et al. (2012) De novo large fusiform posterior circulation intracranial aneurysm presenting with subarachnoid hemorrhage 7 years after therapeutic internal carotid artery occlusion: case report and review of the literature. *Neurosurgery* 71: 764-771.

16. Burrows AM, Zipfel G, Lanzino G (2012) Treatment of a pediatric recurrent fusiform Middle Cerebral Artery (MCA) aneurysm with a flow diverter. *BMJ Case Rep* 2012.
17. Labeyrie MA, Lenck S, Bresson D, Desilles JP, Bisdorff A, et al. (2015) Parent artery occlusion in large, giant, or fusiform aneurysms of the carotid siphon: Clinical and imaging results. *AJNR Am J Neuroradiol* 36: 140-145.
18. Passacantilli E, Anichini G, Cannizzaro D, Fusco F, Pedace F, et al. (2013) Awake craniotomy for trapping a giant fusiform aneurysm of the middle cerebral artery. *Surg Neurol Int* 4: 39.
19. Fischer S, Perez MA, Kurre W, Albes G, Bätzner H, et al. (2014) Pipeline embolization device for the treatment of intra-and extracranial fusiform and dissecting aneurysms: Initial experience and long-term follow-up. *Neurosurgery* 75: 364-374.
20. Cappellari M, Tomelleri G, Piovan E, Bovi P, Moretto G, et al. (2012) Chronic fusiform aneurysm evolving into giant aneurysm in the basilar artery. *Neurol Sci* 33: 111-115.
21. Chen Z, Yang Y, Miao H, Tang W, Chen J, et al. (2013) Endovascular treatment for large and giant fusiform aneurysms of the vertebrobasilar arteries. *Clin imaging* 37: 227-231.
22. Win HK, Polsani V, Chang SM, Kleiman NS (2012) Stent-assisted coil embolization of a large fusiform aneurysm of proximal anterior descending artery: novel treatment for coronary aneurysms. *Circ Cardiovasc Interv* 5: 3-5.
23. Zarzecka A, Gory B, Turjman F (2014) Implantation of two flow diverter devices in a child with a giant, fusiform vertebral artery aneurysm: case report. *Pediatr Neurol* 50: 185-187.
24. Tan LA, Mofstakhar R, Lopes DK (2013) Treatment of a ruptured vertebrobasilar fusiform aneurysm using pipeline embolization device. *J Cerebrovasc Endovasc Neurosurg* 15: 30-33.
25. Luo Q, Wang H, Xu K, Yu J (2012) Endovascular treatments for distal posterior cerebral artery aneurysms. *Turk Neurosurg* 22: 141-147.
26. Devulapalli KK, Chowdhry SA, Bambakidis NC, Selman W, Hsu DP (2013) Endovascular treatment of fusiform intracranial aneurysms. *Journal of neurointerventional surgery* 5: 110-116.
27. Szikora I, Turányi E, Marosfoi M (2015) Evolution of flow-diverter endothelialization and thrombus organization in giant fusiform aneurysms after flow diversion: A histopathologic study. *AJNR Am J Neuroradiol* 36: 1716-1720.
28. Awad AJ, Mascitelli JR, Haroun RR, De Leacy RA, Fifi JT, et al. (2017) Endovascular management of fusiform aneurysms in the posterior circulation: the era of flow diversion. *Neurosurgical focus* 42: 14.
29. Shapiro M, Becske T, Riina HA, Raz E, Zumofen D, et al. (2014) Toward an endovascular internal carotid artery classification system. *AJNR Am J Neuroradiol* 35: 230-236.
30. Sacho RH, Saliou G, Kostynskyy A, Menezes R, Tymianski M, et al. (2014) Natural history and outcome after treatment of unruptured intradural fusiform aneurysms. *Stroke* 45: 3251-3256.



- Advances In Industrial Biotechnology | ISSN: 2639-5665
- Advances In Microbiology Research | ISSN: 2689-694X
- Archives Of Surgery And Surgical Education | ISSN: 2689-3126
- Archives Of Urology
- Archives Of Zoological Studies | ISSN: 2640-7779
- Current Trends Medical And Biological Engineering
- International Journal Of Case Reports And Therapeutic Studies | ISSN: 2689-310X
- Journal Of Addiction & Addictive Disorders | ISSN: 2578-7276
- Journal Of Agronomy & Agricultural Science | ISSN: 2689-8292
- Journal Of AIDS Clinical Research & STDs | ISSN: 2572-7370
- Journal Of Alcoholism Drug Abuse & Substance Dependence | ISSN: 2572-9594
- Journal Of Allergy Disorders & Therapy | ISSN: 2470-749X
- Journal Of Alternative Complementary & Integrative Medicine | ISSN: 2470-7562
- Journal Of Alzheimers & Neurodegenerative Diseases | ISSN: 2572-9608
- Journal Of Anesthesia & Clinical Care | ISSN: 2378-8879
- Journal Of Angiology & Vascular Surgery | ISSN: 2572-7397
- Journal Of Animal Research & Veterinary Science | ISSN: 2639-3751
- Journal Of Aquaculture & Fisheries | ISSN: 2576-5523
- Journal Of Atmospheric & Earth Sciences | ISSN: 2689-8780
- Journal Of Biotech Research & Biochemistry
- Journal Of Brain & Neuroscience Research
- Journal Of Cancer Biology & Treatment | ISSN: 2470-7546
- Journal Of Cardiology Study & Research | ISSN: 2640-768X
- Journal Of Cell Biology & Cell Metabolism | ISSN: 2381-1943
- Journal Of Clinical Dermatology & Therapy | ISSN: 2378-8771
- Journal Of Clinical Immunology & Immunotherapy | ISSN: 2378-8844
- Journal Of Clinical Studies & Medical Case Reports | ISSN: 2378-8801
- Journal Of Community Medicine & Public Health Care | ISSN: 2381-1978
- Journal Of Cytology & Tissue Biology | ISSN: 2378-9107
- Journal Of Dairy Research & Technology | ISSN: 2688-9315
- Journal Of Dentistry Oral Health & Cosmesis | ISSN: 2473-6783
- Journal Of Diabetes & Metabolic Disorders | ISSN: 2381-201X
- Journal Of Emergency Medicine Trauma & Surgical Care | ISSN: 2378-8798
- Journal Of Environmental Science Current Research | ISSN: 2643-5020
- Journal Of Food Science & Nutrition | ISSN: 2470-1076
- Journal Of Forensic Legal & Investigative Sciences | ISSN: 2473-733X
- Journal Of Gastroenterology & Hepatology Research | ISSN: 2574-2566
- Journal Of Genetics & Genomic Sciences | ISSN: 2574-2485
- Journal Of Gerontology & Geriatric Medicine | ISSN: 2381-8662
- Journal Of Hematology Blood Transfusion & Disorders | ISSN: 2572-2999
- Journal Of Hospice & Palliative Medical Care
- Journal Of Human Endocrinology | ISSN: 2572-9640
- Journal Of Infectious & Non Infectious Diseases | ISSN: 2381-8654
- Journal Of Internal Medicine & Primary Healthcare | ISSN: 2574-2493
- Journal Of Light & Laser Current Trends
- Journal Of Medicine Study & Research | ISSN: 2639-5657
- Journal Of Modern Chemical Sciences
- Journal Of Nanotechnology Nanomedicine & Nanobiotechnology | ISSN: 2381-2044
- Journal Of Neonatology & Clinical Pediatrics | ISSN: 2378-878X
- Journal Of Nephrology & Renal Therapy | ISSN: 2473-7313
- Journal Of Non Invasive Vascular Investigation | ISSN: 2572-7400
- Journal Of Nuclear Medicine Radiology & Radiation Therapy | ISSN: 2572-7419
- Journal Of Obesity & Weight Loss | ISSN: 2473-7372
- Journal Of Ophthalmology & Clinical Research | ISSN: 2378-8887
- Journal Of Orthopedic Research & Physiotherapy | ISSN: 2381-2052
- Journal Of Otolaryngology Head & Neck Surgery | ISSN: 2573-010X
- Journal Of Pathology Clinical & Medical Research
- Journal Of Pharmacology Pharmaceutics & Pharmacovigilance | ISSN: 2639-5649
- Journal Of Physical Medicine Rehabilitation & Disabilities | ISSN: 2381-8670
- Journal Of Plant Science Current Research | ISSN: 2639-3743
- Journal Of Practical & Professional Nursing | ISSN: 2639-5681
- Journal Of Protein Research & Bioinformatics
- Journal Of Psychiatry Depression & Anxiety | ISSN: 2573-0150
- Journal Of Pulmonary Medicine & Respiratory Research | ISSN: 2573-0177
- Journal Of Reproductive Medicine Gynaecology & Obstetrics | ISSN: 2574-2574
- Journal Of Stem Cells Research Development & Therapy | ISSN: 2381-2060
- Journal Of Surgery Current Trends & Innovations | ISSN: 2578-7284
- Journal Of Toxicology Current Research | ISSN: 2639-3735
- Journal Of Translational Science And Research
- Journal Of Vaccines Research & Vaccination | ISSN: 2573-0193
- Journal Of Virology & Antivirals
- Sports Medicine And Injury Care Journal | ISSN: 2689-8829
- Trends In Anatomy & Physiology | ISSN: 2640-7752

Submit Your Manuscript: <https://www.heraldopenaccess.us/submit-manuscript>