Management of Arteriovenous Fistula in a 39-year Old Male Patient

Charmaine M. Sanchez 1,2, Mylene S. Andal 1,2, Gerard Q. de Guzman3

1School of Pharmacy, Centro Escolar University, San Miguel, Manila, Philippines
2Graduate School, Centro Escolar University, Mendiola, Manila, Philippines
3Department of Microbiology and Parasitology, Francisco Q. Duque Medical Foundation, Lyceum Northwestern University, Dagupan City, Pangasinan, Philippines

Corresponding Author: Charmaine M. Sanchez
csanchez@ceu.edu.ph

ABSTRACT

Dural arteriovenous fistula (DAVF), is an abnormal connection of vessels in the tissues around the brain or spinal cord in which one or more arteries are directly connected to one or more veins or venous spaces called sinuses, which may or may not be asymptomatic for years. The case presented is about an osteodural arteriovenous fistula which is not a common location for DAVFs and reported through its clinical and pharmacotherapeutic management during and after the patient’s diagnosis. The patient interviewed is a 39-year old Asian male his symptoms were non-aggressive as manifested by severe headaches and tinnitus. He is already hyperlipidemic and hypertensive prior to the admission with history of asthma attacks.

Keywords: Management, Arteriovenous, Fistula

1. INTRODUCTION

Dural arteriovenous fistula (DAVF), during adulthood maybe an acquired disease, through vascular diseases like cerebral arteriovenous malformations (AVM), maxillofacial AVM, bone AVM, cavernomas, and intradural or extradural arterial aneurysm. Multiple DAVFs at different locations in one patient have also been reported [1]. The most serious problem associated with DAVFs is that they transfer high-pressure arterial blood into the veins or venous sinuses that drain blood from the brain or spinal cord. This might result in an increase in the pressure of the venous system around the brain or spinal cord causing damage [2]. Majority of DAVFs have leptomeningeal reflux and vascular congestion. Symptoms of DAVFs may be characterized either as being non-aggressive (e.g. bruits) or aggressive (e.g. intracerebral, subarachnoid hemorrhage and many neurological deficits) [3].

Arteriovenous fistula in the dura mater may also be congenital or it can occur at any point in the vascular system; and may vary in size, length, location, and number [3]. Patients with AVF typically presents with a rumbling noise in the ear called bruits and it may be diagnosed using angiography technique. An angiogram is an X-ray procedure that is considered the gold standard for evaluating blockages in the arterial system. An angiogram detects blockages using X-rays taken during the injection of a contrast agent [4]. Digital subtraction angiography is the standard for diagnosing fistulas. Endovascular treatment is one of the first line options for management [5]. The purpose of this report is to
provide both clinical and pharmacotherapeutic management for a 39-year old Male Asian patient with a unique osteodural AVF having co morbidities (such as hypertension, hyperlipidemia and bronchial asthma).

2. CASE PRESENTATION

A 39-year old male patient working as a college professor was brought to the emergency department of a tertiary hospital on the 29th of June. He was complaining of episodic severe headache for almost one and a half month with feeling of constant drowsiness during the day and an elevated body temperature. His headache radiates from the left temporal lobe with 9/10 Visual Analog Scale (VAS) pain scoring. The patient has a history of bronchial asthma and hypertension. Upon examination it was noted that his left tympanic membrane was perforated but the rest of his physical examination was unremarkable. A CT scan was frequently reported as cited from Natarajan et al in 2010 to allow rapid diagnosis and treatment even for uncooperative patients. It also provides good image quality even for a steno occlusive diseases and acute ruptured cerebral aneurysm [8]. On the other hand, magnetic resonance angiography was used as an additional imaging tool to study the patients’ blood flow and blood vessel morphology [9]. He was subjected to both magnetic resonance angiography and CT scan but both results were normal.

The patient was advised to undergo lumbar puncture (LP) to determine whether there is bacterial or viral infection causing the episodic headaches, this was scheduled on the 10th of July. The cerebrospinal fluid (CSF) was tested for presence of bacteria and virus and results were found to be negative, so conditions like meningitis and other infectious diseases were ruled out. An elevated pressure after the lumbar puncture was noted. The neurologist prepared for a double setting in case the need of for both embolization arises. The goal of embolization is to achieve an angiographic cure by obliteration of all feeders and proximal draining veins with preservation of the patency of the affected sinus. The neurologist and surgeon decided to go through angiography which was done by inserting a 6 French Sheath in the femoral artery used the Seldinger technique with general anesthesia. A 5 French Berenstein catheter was then used to select the vessel through which angiographic runs were performed. The left external carotid artery (LICA) show good filling of the left anterior cerebral artery (LACA) and middle cerebral arteries (MCA). There was good filling of the right transverse sinus (RTS). The proximal 3rd to middle 3rd of the left transverse sinus (LTS) was not seen. The distal 3rd of the LTS was seen to drain blood from the left vein of the Labbe and into the left sigmoid sinus (LSS). There was a small cortical vein from the torcula to the distal 3rd of the LSS that drains antegrade. The superior sigmoid sinus (SSS) is small in caliber with no venous congestion. The left external carotid artery (LECA) showed an osteo dural arteriovenous fistula (ODAVF) on the infero lateral temporal bone supplied by the sphenoidal branch of the left middle meningeal artery (MMA) with drainage located at the left inferior petrosal sinus. No cortical retrograde veins was seen. The impression results showed an Osteodural AV fistula and absence of the proximal middle 3rd of the left transverse sinus since there was a need to confirm whether it is sinus thrombosis or congenital. After more than a month of hospitalization the patient was discharged with improved condition through normal laboratory results and electrolytes. The patients take home medication are as follows:

<table>
<thead>
<tr>
<th>Table 1: Home medications</th>
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<tbody>
<tr>
<td><strong>DRUG</strong></td>
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<tr>
<td>Carbamazepine</td>
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<tr>
<td>Lamotrigine</td>
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<tr>
<td>Levetiracetam (KeppraR)</td>
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<td>Celecoxib</td>
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<td>Mefenamic acid</td>
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<td>Senna</td>
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<td>Losartan</td>
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<td>Clopidogrel</td>
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<td>Atorvastatin</td>
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The patient was advised to see a neurologist for follow up after two weeks to check for his progress and to check his sodium and potassium levels. All laboratory values were noted as normal after the follow up check-up, patients condition has greatly improved his sodium and potassium levels are within normal range, his blood pressure was 120/79 mmHg, there were no seizure attacks noted. The patient is currently not practicing his profession but instead opted to devote his time to his children to avoid stress from his job. He also relocated to a residence in the city with more

ventilation to improve his environment and to facilitate better breathing noting that the patient having a history of asthma and hypertension.

3. DISCUSSION

The patients’ osteodural AVF was managed with angiography without embolization. Although the location of the patients’ fistula is not common, the procedure was enough to prevent continuous abnormal drainage in the infero lateral temporal bone supplied by the sphenoidal branch of the left Middle meningeal artery. Dural Arteriovenous Fistulas (DAVF) management included an open surgery, radiosurgery, embolization or combined treatment [7,8,10]. The transverse sigmoid sinus (TSS) was the most commonly reported location of DAVFs, in this case the patient presented with an osteodural AVF which is statistically uncommon. Radiation therapy was also used in DAVFs to limit invasiveness with fewer complications but the latency and frequency of radiotherapy is a major disadvantage so it was not utilized in our patient [11,12]. Sinus re-sectioning and isolation was also performed in some other cases and sometimes considered to be the first line treatment. Endovascular procedures can easily and safely disconnect a venous drainage, but post-surgery effects like prolonged headache and seizure attacks should be monitored closely. In some instance, treatment may only involve palliative care like pain management due to some reported cases of spontaneous DAVF regression [13]. Other DAVF cases, were presented without any other co-morbidities. The pharmacotherapeutic management were not included in the reports and there were no medication therapeutic management presented after surgical procedures. This report focused on these parameters as post-operative management of the condition. The study was based on factual information and limited on the data found on the patients’ medical history and results of several interviews. All data’s gathered were obtained with the patients’ consent. The results of drug effects were clinically observed after angiographic procedures to determine the patients’ status whether the therapeutic management and treatment goals were achieved. This way the management done with this patient may be duplicated in other patients having the same case and same co-morbidities. Celecoxib 200mg was given together with mfenamic acid as needed to manage the pain post angiography. Seizures were to be expected after DAVF to avoid its occurrence and for which carbamazepine 400 mg tablet was given once a day. The patient was advised to take it at night with food and to avoid too much exposure to sunlight which might cause hypersensitivity reactions. Lamotrigine 50 mg tablet once a day was also given together with carbamazepine as adjunct. Levetiracetam 500 mg was also given to decrease abnormal brain excitation and muscle jerks or twitches. The patient complained of daytime drowsiness, weakness and dizziness with his drugs so he was still on leave from work until his symptoms improve. Carbamazepine was reduced to 200 mg after a month and was completely removed from the patients’ medication regimen together with lamotrigine after 6 months of treatment, leaving levetiracetam to be continued for up to a year. Senna was also given at 8.6 mg at two tablets twice daily for constipation and the patient was advised to take it for not more than a week and only if he only experience constipation.

After two weeks the patient was advised to adjust acetazolamide to once a day for 2 days allowing one day of rest to optimize its diuretic effects. Potassium supplement was prescribed with the dose of 2 tablets 750 mg (equivalent to 9.8 millimole or milliequivalent) once a day to avoid hypokalemia. Potassium levels were elevated in a month so it was discontinued, since the patients’ potassium levels was probably increased because of losartan. Atorvastatin 40 mg once a day was given to elevate the patients HDL and to prevent stroke. Clopidogrel at 75mg OD to be taken at night was given as prophylaxis to thromboembolic disorders. Although GI irritation was noted after two weeks of intake the patient was asked to continue the drug until the next follow up after 2 more weeks. No proton pump inhibitor was given, and patient was advised to take clopidogrel after dinner. Clopidogrel was discontinued after six months leaving only losartan and atorvastatin in his regimen.

4. CONCLUSION

The patients’ condition was improved upon discharge having normal laboratory and diagnostic tests results his CT scan revealed closure of the fistula. His neurological and pharmacologic treatment of arteriovenous fistula was effective which was evident through clinical improvements on the patient. The patient had no seizure attacks and no severe headaches. Patients sodium and potassium levels were maintained to a normal level after a month of therapy. The patients’ hypertension was controlled and maintained to a range of 120/80 to 125/90 mmHg. The
patients’ lipid profile resulted to cholesterol level of 180 mg/dL, LDL-C of 125 mg/dL, triglyceride of 140 mg/dL and total cholesterol of 190 mg/dL during the patients’ laboratory examination. His HDL-C was routinely monitored at 50 mg/dL with continuing monitoring of patients’ diet and a biennial check-up. All the patients’ other medications for hypertension & hyperlipidemia was retained in addition to pain management drugs which were only taken as needed after angiography.

REFERENCES