Case Report

Successful anesthetic management of a 17-year-old patient with facial arterio-venous undergoing sclerotherapy: a case report

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Received: 17 March 2019
Accepted: 02 May 2019

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ABSTRACT

Arterio-venous malformations (AVM) are abnormal collection of blood vessels. They are rare congenital vascular malformations that account for 1.5% of all vascular abnormalities while 50% of such cases occur in the oral and maxillofacial region. Facial AVM are uncommon. Patients presenting with AVMs require a complete investigation using precise clinical examination and advanced imaging modalities. The treatment of a patient with AVM includes a multi-step process. In this case, we report a case of extensive AVM in the face of a 17-year-old female patient. The report primarily focuses on the successful anesthetic management for sclerotherapy along with insights on clinical characteristics and imaging manifestations. To the best of our knowledge, this is one of the few cases to be reported in India.

Keywords: Anesthetic management, Arteriovenous malformation, Difficult airway

INTRODUCTION

Vascular anomaly is based on a variety of vascular pathology such as vascular malformations and proliferating vascular tumors. The treatment of vascular anomalies is often multifactorial which may include interventional radiology approaches such as sclerotherapy, embolic therapy, and laser coagulation. These procedures play a key role in the management of vascular anomalies.1 Arteriovenous malformations (AVMs) are unusual congenital lesions that can occur anywhere in the body. AVMs can be life-threatening due to the potential of massive hemorrhage.2 AVMs are an uncommon congenital vascular malformations. As per current evidence, AVMs account for 1.5% of all vascular abnormalities while 50% of such cases occur in the oral and maxillofacial region.2 In this paper, we describe a rare case of extensive arteriovenous malformation in the face of a 17 yr. old female patient, its clinical characteristics and imaging manifestations as well as the satisfactory anesthetic management for sclerotherapy.

CASE REPORT

A 17-year-old patient reported to our center with swelling on her left cheek. The patient reported to have progressive swelling since her childhood. The patient had no history of tobacco smoking, alcohol, or any known substance abuse. Managing patients undergoing sclerotherapy with AVM is an anesthetic challenge. We report a successful anesthetic management of a patient with AVM in our center. The lesion had spread into the oropharynx involving the left buccal mucosa and the left lateral border of the tongue. The patient had complained...
of intermittent and throbbing pain. A change in voice was also observed. The patient suffered from a skin plethora at the left cheek that extended up to the neck. The patient was advised a magnetic resonance imaging (MRI) neck angiography. A large multiloculated cystic lesion with internal septations arising from and involving the left maxillofacial region was observed. Internal phlebolith within the lesion was also observed (Figure 1).

The lesion extended up to the left temporal and infra-temporal and the left nasopharyngeal lesion. It revealed a large multiloculated cystic lesion with internal septations arising from and involving left maxillofacial region showing internal phlebolith within the lesion. The lesion extended to several areas of the oro-facial region such as the left retromolar trigone, left lateral tongue border, left tonsilolingual sulcus, left lateral pharyngeal mucosal space, pre and para epiglottic region. Intraluminal narrowing was observed due to oropharyngeal extension. The anterior extension reached the left lower lip, submental space, submandibular space, and masticator space.

The MRI was suggestive of venous malformation due to lack of any arterial or venous feeder on MRI imaging. The patient’s routine laboratory investigations were within normal limits. An informed consent was taken from the patient. The patient was explained about fibre-optic intubation under mild sedation considering her airway was difficult to manage otherwise.

The patient was kept nil-by-mouth (NBM) for six hours as per standard protocol. The patient was administered Ringer’s lactate via a large bore intravenous access secured with an 18G Venflon on right hand. The patient’s weight was 40 kilo grams (Kg) and height 150 cm. The patient was pre-medicated with glycopyrolate 0.2mg and intravenous ondansetron. The patient was nebulized with budecort and topical lignocaine (4%). The patient was given oxygen via Hudsons mask. The Routine laboratory investigations were within normal limits. Since she was 17 years, we explained and took informed consent for the procedure of fibreoptic intubation under mild sedation as her airway was most difficult to manage otherwise. Patient was kept 6 hours NBM as per standard protocol and large bore intravenous access secured with 18G veinflon on right hand and Ringers lactate started. The patient’s oxygen saturation (SpO2) levels were recorded at 98% (Table 1). The operating team was prepared for difficult intubation. A difficult intubation, trolley, multipara monitor, and defibrillator with all necessary resuscitation equipment was evaluated and kept at stand-by. The lesion made it difficult for the team to hold the mask or insert supraglottic airway devices. Tracheostomy tray and cricithyrotomy equipment were kept at stand by.

| Time min from induction | Pulse /min | BP mm/Hg | SPO2 % | ETCO2 | BIS |
|-------------------------|------------|---------|--------|--------|-----|
| 0                       | 106        | 116/70  | 94     | -      | 97  |
| 5                       | 108        | 118/66  | 94     | -      | 90  |
| 10                      | 104        | 122/80  | 96     | 36     | 85  |
| 15                      | 100        | 126/80  | 98     | 34     | 60  |
| 20                      | 96         | 124/90  | 98     | 32     | 56  |
| 25                      | 98         | 128/66  | 100    | 38     | 55  |
| 30                      | 90         | 104/60  | 100    | 36     | 53  |
| 40                      | 94         | 108/66  | 100    | 34     | 58  |
| 50                      | 92         | 114/72  | 100    | 36     | 56  |
| 60                      | 90         | 118/70  | 100    | 34     | 59  |
| 75                      | 96         | 118/68  | 100    | 38     | 70  |
| 90                      | 94         | 126/84  | 100    | 36     | 85  |
| 100                     | 98         | 122/84  | 100    | 35     | 90  |
| 120                     | 90         | 116/68  | 100    | 37     | 94  |
The patient was sedated with 1 mg midazolam and 15 mg ketamine. A flexible fiber optic bronchoscope was inserted. The patient was intubated with 6 no. flexometallic disposable tube. The patient was inducted with 50 mg propofol and 20 mg xylocard after End-Tidal Carbon Dioxide (ETCO2) confirmation. The patient was maintained with pressure control ventilation (PCV) using \( O_2+N_2O \) (50:50) low flow technique (0.4+0.4 L/min). PCV was maintained using the Drager Fabius Plus anesthesia workstation. BIS monitoring was maintained between 50 to 60 using Sevoflurane 2% and propofol 0.5 to 0.8 mg/kg/hr with fentanyl 0.5 microgram/kg/hr. Muscle relaxants were not used. All vital parameters such as heart rate (HR), blood pressure (BP), ETCO2, temperature, Electrocardiography (ECG), BIS, and anesthesia gas were closely monitored (Table 2). The patient underwent sclerotherapy under fluoroscopic guidance by percutaneous method. The vascular malformation was puncture percutaneous using 22 G scalp vein. The contrast agent, omnipaque (5 ml) was injected to visualize the radio-image of the lesion and needle confirmation within the lesion.

The blood aspirated confirmed it to be low flow venous malformation and not a lymphangiomatous lesion. Sterol, 3% sodium tetradecyl sulfate (STS) 10 ml was injected at multiple sites. The overall procedure was uneventful. Nitrous oxide and sevoflurane were discontinued. The patient had good reflexes and was shifted to the intensive care unit on T-piece. The patient’s vitals were within normal limits (Table 3). As per the radiologist’s opinion and in view of post-sclerotherapy edema and airway compromise, the patient was extubated on the second day post-operatively (Table 4). The patient was discharged on the fifth day post-operative after an uneventful extubation. The patient is on regular follow-up.

**DISCUSSION**

The diagnosis and treatment of vascular anomalies is based on specific terminology and classification. The classification of vascular anomalies is based on the International Society for the Study of Vascular Anomalies (ISSVA) which is a globally accepted system. As per the ISSVA, there are two types of vascular anomalies, i.e. (a) Vascular malformations and (b) Vasoproliferative or vascular neoplasms such as hemangioma. The vascular malformations are a group of lesions associated with disorders of the vascular development. They remain a diagnostic and treatment challenge to healthcare practitioners. The diagnosis in such cases is crucial for the development of optimal treatment. The optimal treatment and management often requires an organized and multidisciplinary approach with diagnostic imaging playing a vital role. The combination of a combined radiological and surgical treatment has been associated with promising results.

**Table 2: Pulse, blood pressure, and diastolic blood pressure charting.**

| Time (min) | Pulse/min | SBP mm/Hg | DBP mm/Hg | ETCO2 | Time post op in hrs | Pulse |
|-----------|-----------|-----------|-----------|-------|--------------------|-------|
| 0         | 106       | 116       | 70        |       |                    | 90    |
| 5         | 108       | 118       | 66        |       |                    | 86    |
| 10        | 104       | 122       | 80        |       |                    | 82    |
| 15        | 100       | 126       | 80        |       |                    | 82    |
| 20        | 96        | 124       | 90        |       |                    | 82    |
| 25        | 98        | 128       | 66        |       |                    | 82    |
| 30        | 90        | 104       | 60        |       |                    | 82    |
| 40        | 94        | 108       | 66        |       |                    | 82    |
| 50        | 92        | 114       | 72        |       |                    | 82    |
| 60        | 90        | 118       | 70        |       |                    | 82    |
| 75        | 96        | 118       | 68        |       |                    | 82    |
| 90        | 94        | 126       | 84        |       |                    | 82    |
| 100       | 98        | 122       | 84        |       |                    | 82    |
| 120       | 90        | 116       | 68        |       |                    | 82    |

**Table 3: Post-op ICU parameters.**

| Time post op in hrs | Pulse | Spo2 | SBP | DBP | ETCO2 | Time post op in hrs |
|---------------------|-------|------|-----|-----|-------|---------------------|
| 1                   | 90    | 98   | 114 | 56  | 36    | 1                   |
| 2                   | 86    | 98   | 106 | 70  | 35    | 2                   |
| 3                   | 82    | 99   | 108 | 66  | 36    | 3                   |
| 4                   | 84    | 97   | 114 | 60  | 34    | 4                   |
| 5                   | 82    | 98   | 108 | 62  | 35    | 5                   |
| 6                   | 80    | 99   | 112 | 78  | 37    | 6                   |

**Table 4: Extubation-Day 3 ICU Monitoring.**

| Time (min) | Pulse | SBP | DBP | Spo2 | ETCO2 |
|------------|-------|-----|-----|------|-------|
| 0          | 98    | 104 | 60  | 99   | 38    |
| 30         | 96    | 108 | 56  | 99   | 36    |
| 60         | 94    | 114 | 66  | 99   | 35    |
| 120        | 90    | 118 | 70  | 99   | 40    |
| 180        | 92    | 116 | 68  | 99   | 42    |
| 240        | 96    | 104 | 68  | 99   | 40    |
The presence of oral or oro-naso-pharyngeal venous malformations presents a difficult case for airway management for highly skilled and experienced anesthesiologist. An extensive and comprehensive planning is required in conjunction to securing the airway by avoiding any complications. In such complex cases, cannot intubate cannot ventilate (CIC) is a common concern.4,5

The use of new treatment modalities such as fiber-optic intubation instead of conventional tracheostomy helps in reducing morbidity.6,7 Limiting the use of anesthetic agent for an uneventful post-operative recovery is an ideal approach.

Vigilance after extubation in order to prevent airway related complications is an effective approach during the perioperative period. STS is an excellent option for interventional radiologist as it offers a simple and effective treatment modality in regressing huge malformations.8,9

Successful management of patient with AVM has been reported in the literature.10,11 This case forms the basis for further research and exploration in the anesthetic management of patients with AVM.

ACKNOWLEDGEMENTS

Authors would like to thank Mr. Lyndon Fernandes for his medical writing assistance.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not Required

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Cite this article as: Kulkarni N, Patil A, Tandale R, Patil S, Nagarkar R. Successful anesthetic management of a 17-year-old patient with facial arterio-venous undergoing sclerotherapy: a case report. Int J Adv Med 2019;6:1356-9.