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(CASE STUDY)

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CT scan pitfalls and angiography's role in juvenile nasopharyngeal angiofibroma: A case report

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Abstract

Diagnosis to treatment of Juvenile Nasopharyngeal Angiofibroma (JNA) required a multidisciplinary approach. CT scan works by combining multi-slice imaging from a device that rotates around the object. The potential of missing certain parts in the scanning process can occur. Angiography was the option to cover the CT scan pitfalls. In this case, we discussed CT scan pitfalls that can be overcome by angiography through JNA case report by showing clearer picture of the JNA and its feeding artery. 14 years old child complained of nasal congestion. On physical examination, the lesion expanded the anterior side of nasal cavity. The patient underwent a synonasal CT scan without contrast. It was obtained a heterogeneous solid mass in the nasopharynx extending to the concha and right and left maxillary sinuses. However, until the preparation of angiography, the actual size of the tumor, as well as the entire vasculature, is not yet known. The angiographic features suggested that the right side (seen in the right maxillary artery) was more dominant than the left side. However, both the right and the left finding reassured that the tumor location was more dominant in the anterior nasal cavity. The posterior lesion was also seen but did not predominate in comparison to the anterior. These findings helped clinicians in planning operative action in order to evacuate the tumor.

Keywords: Angiography; CT Scan; Juvenile Nasopharyngeal Angiofibroma

1. Introduction

Juvenile Nasopharyngeal Angiofibroma (JNA) is a case that requires a multidisciplinary approach starting from the process of identification, diagnosis, to management. Based on epidemiological data, JNA is a rare benign tumor, which is only about 0.05% - 0.5% of all tumors of the head and neck (1). The case in men is more common than in women with an age range of 7 to 29 years. JNA is a tumor originating from vascular tissue which is often located in the nasopharynx posterior and sphenopalatine foramen (2). Because of its location, JNA can expand to the surrounding organs, causing face area swelling, nasal congestion (unilateral or bilateral), and hyposmia. To supply tumor survival, JNA expands by anchoring the neovascularization to the surrounding arteries (feeding artery). Recruited feeding arteries can come from the right or left side of the face.

CT scan is a sophisticated modality that plays a role in diagnosis so that clinicians can consider further management. CT scan works by combining multi-slice imaging from a device that rotates around the object (3). The potential of missing certain parts in the scanning process can occur, especially if the object of the scanning is a small lesion/tumor or hidden behind bone structures or solid organs (4). The vascularity of the tumor can be described on a CT scan. However, in the case of tumors with multiple neovascularisations originating from the arteries on the right and left sides, a CT scan can still have pitfalls in fully depicting the lesion. Angiography examination is an important option in covering the CT scan

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pitfalls. In this case, we will discuss CT scan pitfalls that can be overcome by an angiography examination that can provide a clearer picture of the JNA and its feeding artery.

2. Case Illustration

14 years old child complained of nasal congestion. The complaint has been felt for about 2 years. The complaint initially disappeared, but now the child feels it continuously. The complaint is getting worse. The patient complained of frequent nosebleeds since 7 months ago. Within 1 week, nosebleeds can occur more than 8 times without any clear trigger, amounting to an average of 50-70 cc of fresh blood. The patient's voice became nasal since 8 months ago. The patient got a feeling of blockage in the throat area. Based on physical examination by the clinician, a posterior mass is suspected. On physical examination, the clinician suspects that the expansion of the lesion is reaching the anterior side. However, until the preparation of angiography/intervention measures, the actual size of the tumor, as well as the entire vasculature, is not yet known.

Figure 1 A Boy, 14 years old with juvenile nasopharyngeal angiofibroma

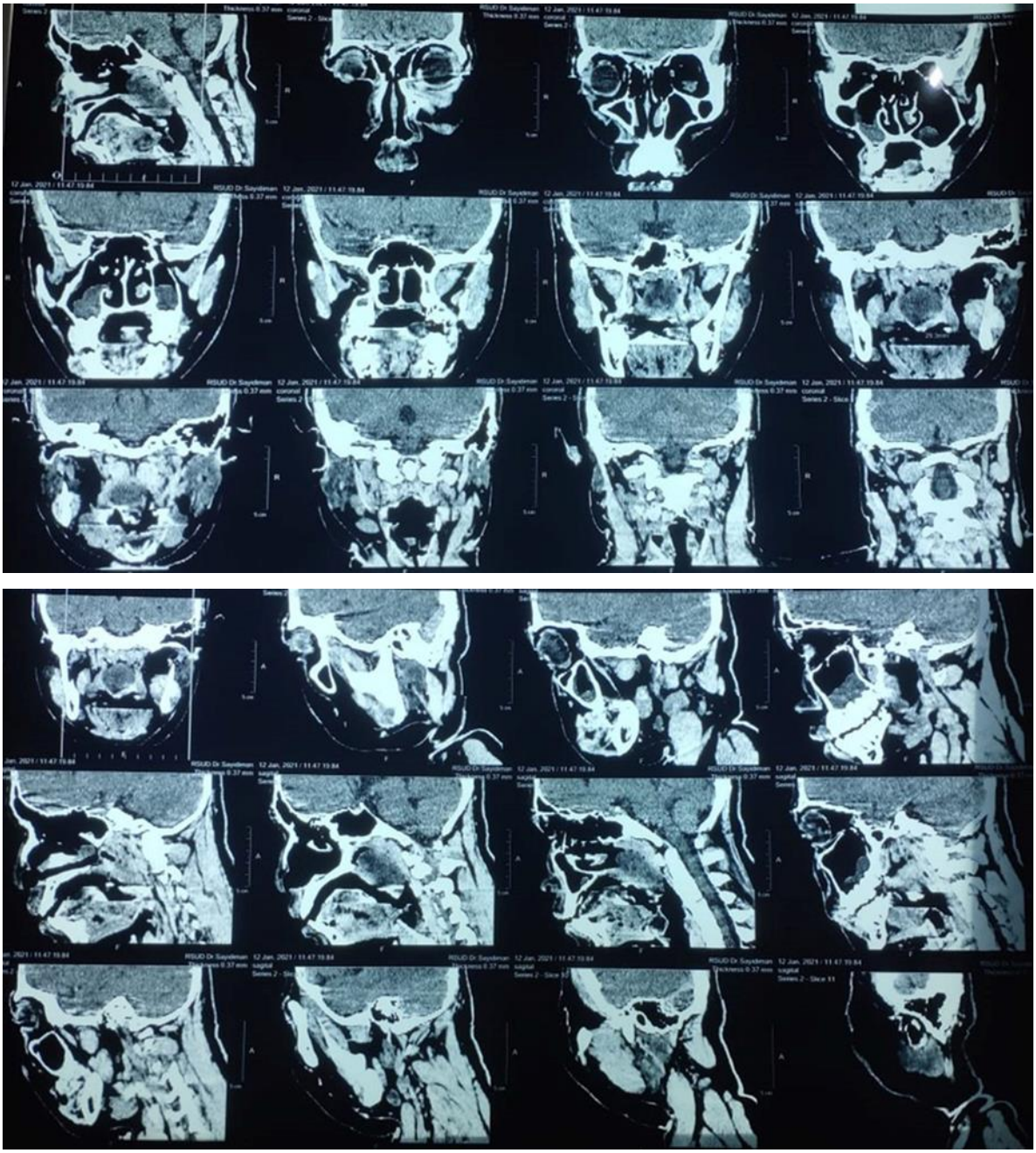

Figure 2 CT Scan obtained heterogeneous solid mass in the nasopharynx, extending to the concha, right and left maxillary sinuses

The patient underwent a synonasal CT scan without contrast. It was obtained a heterogeneous solid mass in the nasopharynx extending to the concha and right and left maxillary sinuses. Based on these descriptions, the radiologist directed the abnormality as Juvenile Nasopharyngeal Angiofibroma (JNA) accompanied by right mastoiditis. With this condition, the clinician conducted consultation regarding the embolization of blood vessels that provide feeding of the lesion to minimize bleeding during the lesion operative evacuation. Embolization utilized temporary geal foam. Prior to embolization, the interventionist performed angiography by inserting a catheter through the external carotid artery followed by injection of water soluble contrast. The angiographic features suggested that the right side (seen in the right maxillary artery) was more dominant and it was also clear that the location of the lesion was predominantly on the anterior nasal cavity. The catheter was directed towards the left side of the external carotid artery until feeder artery was obtained from the left maxillary artery and left facial artery. The image on the left further reassured that the tumor location was more dominant in the anterior nasal.

The posterior lesion was also seen but did not predominate in comparison to the anterior. Thus, it was clear that the location of the tumor with angiographic examination was shown to be more detailed in describing the position of the tumor and the feeding artery compared to the results of CT scan. These results helped clinicians in planning operative action in order to evacuate the tumor.

3. Discussion

CT scan is an appropriate modality to image JNA. To reveal the entire lesion, the cuts should be thin. Thick cuts cannot provide sufficient information about the exact location, size, and the feeding artery. CT scan works by utilizing X-ray irradiation at various angles by circling the examined object. The result of these various angles irradiation captures an object so that it can represent the object as a three-dimensional image. The pieces of the image taken from various angles are then processed on a computer that has been equipped with software so that it produces a complete image. The greater the number of cuts produced, the smaller the potential of passing the lesion in each cut (in this case, it depends on the slice specification of the CT scan tool). Based on a study conducted by Gupta in 2015, it was found that CT scan is a reliable modality for diagnosing JNA with various advantages such as scanning process speed and differentiating tumors from healthy tissue around the tumor (5). However, to further explore the character of the whole tumor as well as the feeder artery that vascularizes the tumor, a CT scan has the potential to miss several sections. This occurs due to not capturing a certain part of the object because it is missed from the scan when the CT scan rotates around the object. Figure 3 illustrates how a CT scan could potentially miss a part of an object.

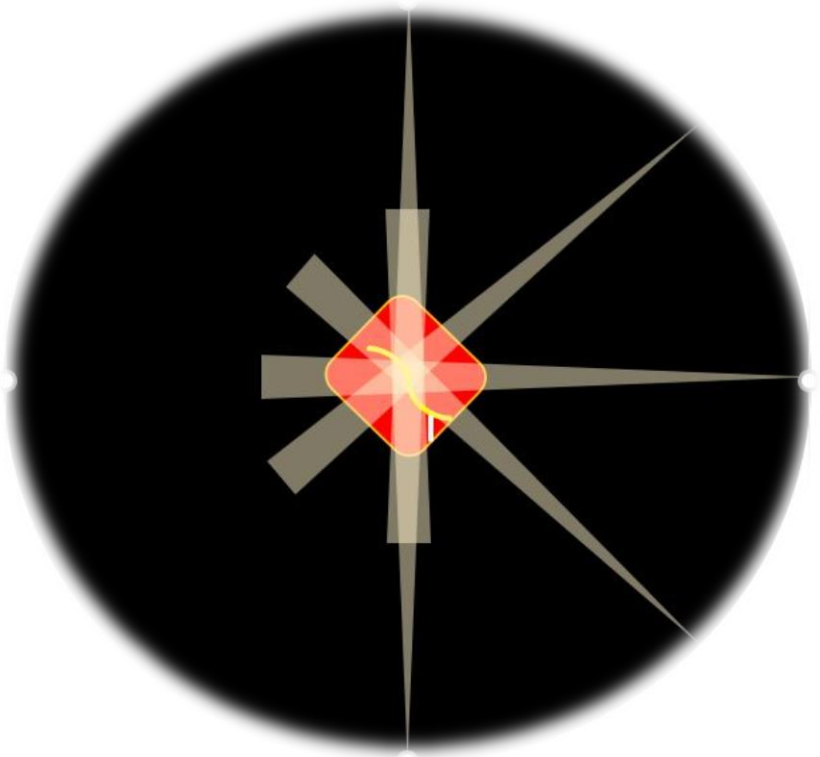

Figure 3 CT Scan pitfalls in the visualization process, the white line was missed from the shooting light

In contrast to CT scan, angiography directly scans by including water-soluble contrast in the arteries to the end-artery of an object. Angiography is a procedure that is often performed to see the direction of blood vessels or feeding artery in cases of tumors (6). By using angiography, it is hoped that it can show the feeding artery that vascularizes the tumor and show the location of the lesion more accurately than the CT scan. Angiography examination attempts to visualize the entire artery feeding of the tumor.

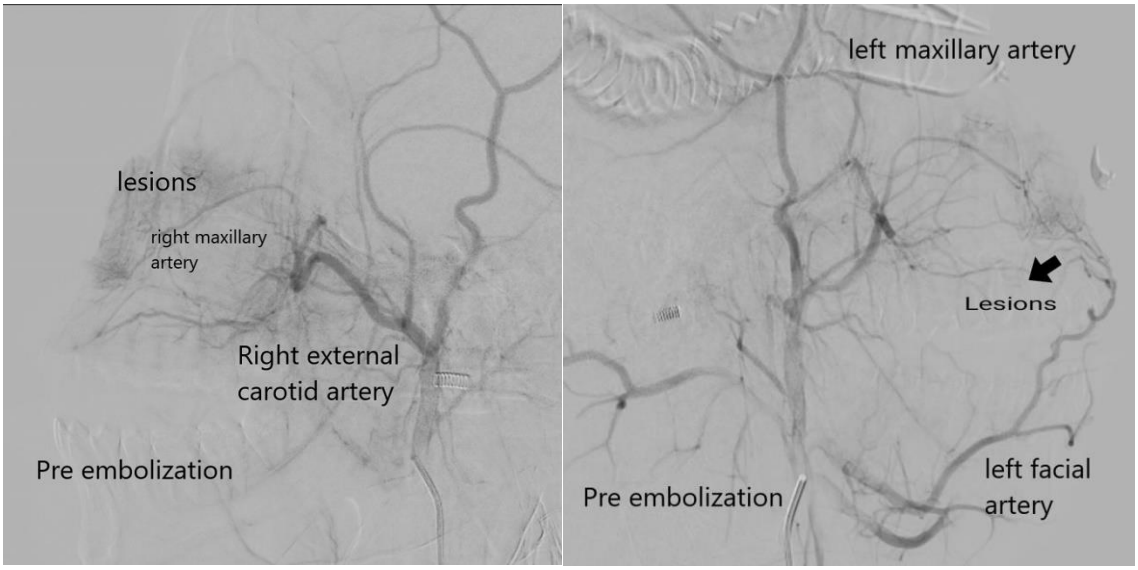

Figure 4 Angiography results that describe the tumor completely

Because all parts of the tumor have a vascular flow, visualization of the feeding artery is an alternative that provides a solution to depict the entire tumor's appearance (7). This has a positive effect in the process of tumor evacuation on operative action so that it does not leave a residual mass. Full image of the tumor accompanied by feeding artery is important to determine follow-up action for clinicians and disease prognosis.

4. Conclusion

CT scan is a reliable tool for locating lesions in the body. In this case of JNA, a CT scan was not sufficient to fully depict the lesion due to the position of the tumor and the multiple feeding arteries located on both sides of the face (right/left). Therefore, angiography can be used as a complement to information related to JNA so that it should be considered by clinicians in decisions making and action planning.

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interests. The authors report no conflicts of interest in this work. By this statement, all authors who consist of Prasetyo Sarwono Putro, Meutia Apriani, Muchtar Hanafi, Vania Puspitasari have no conflict of interest regarding this manuscript publication.

Statement of informed consent

Informed consent was obtained from the patient and his family whose data mentioned in the study.

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