IJPSR (2015), Vol. 6, Issue 7 (Research Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 28 November, 2014; received in revised form, 02 April, 2015; accepted, 13 May, 2015; published 01 July, 2015

HYPERDENSE INTRACRANIAL VESSELS IN NON-CONTRAST COMPUTED TOMOGRAPHY SCAN OF BRAIN-A CASE REPORT

P. Bahinipati, Ranjan Kumar Sahoo, Suresh Kumar Behera and Niranjan Sahu

Department of Radio-diagnosis, IMS & SUM Hospital, Bhubaneswar-751003, Odisha, India

Keywords:

Hyperdense vessel of brain, tetralogy of Fallot, secondary polycythemia.

Correspondence to Author:
Dr. Ranjan kumar Sahoo

MD, Associate Professor, Department of Radio-diagnosis, IMS & SUM Hospital, Bhubaneswar-751003, Odisha, India

E-mail: darierdarier2000@gmail.com

ABSTRACT: A 20-year-old male patient reported to ophthalmology outpatient department with complaint of loss of vision in right eye since childhood and diminished vision in left eye for 1month of duration. Funduscopy revealed right side optic atrophy and left sided vitreous hemorrhage. Non-contrast computed tomography study of head showed hyperdense circle of Willis and cerebral venous sinuses. No contrast was given before the computed tomography scan of head. Bilateral orbit showed right sided oval enlarged eye ball with medial deviation and normal left eye ball. Magnetic resonance venography was advised to rule out sinus venous thrombosis which revealed normal study of sinuses. On clinical examination, the patient had clubbing of all fingers, mild cyanosis, hyperemia of lower conjunctiva and systolic murmurs on auscultation with raised hematocrit level (72 percentage). Echocardiography examinations of the patient shows features of tetralogy of Fallot (TOF). The hyper-dense vessel was due to raised hematocrit (secondary polycythemia Vera).

INTRODUCTION: Non-contrast computed tomography scan (NCCT) is an important diagnostic tool to rule out intracranial lesion due to its wide availability, quick performance and low cost than Magnetic Resonance Imaging (MRI). Hyperdense cerebral arteries in acute stoke are well described in NCCT scan of head. [1] Hyperdense cerebral artery and vein can be seen in raised hematocrit level due to linear correlation between hematocrit and computed tomography attenuation. [2, 3] We report a case of tetralogy of Fallot with raised hematocrit level and associated hyperdense cerebral arterial and venous sinuses in NCCT scan of head thus simulating contrast-enhanced computed tomography study.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.6(7).3091-93

Article can be accessed online on: www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.6(7).3091-93

Case Report: A 20-year-old male patient reported to ophthalmology out-patient department with complaint of loss of vision in right eye since childhood and diminished vision in left eye for one month of duration. Funduscopy revealed right side optic atrophy and left side vitreous hemorrhage. Right eye showed medial deviation. He was referred to radiology department for NCCT scan of head and orbit to rule out intracranial lesions. NCCT study of head showed hyperdense circle of Willis and cerebral venous sinuses. Bilateral orbit revealed right side oval enlarged eye ball with medial deviation and normal left eye ball. Magnetic resonance venography (MRV) of brain showed normal study of cerebral venous sinuses (**Fig.1**).

Possibility of raised hematocrit was suspected for hyperdense intracranial vessels. On clinical examination, the patient had clubbing of all fingers, mild cyanosis, hyperemia of lower conjunctiva and systolic murmurs on auscultation. His hematocrit level was 72 percentage Echocardiography

examinations of the patient showed features of tetralogy of Fallot (TOF) such as right ventricular hypertrophy, overriding of aorta, ventricular septal defect and subpulmonary stenosis (**Fig.2**). The patient was advised for cardiothoracic consultation for correction of cardiac anomaly and ophthalmology department for vision correction.

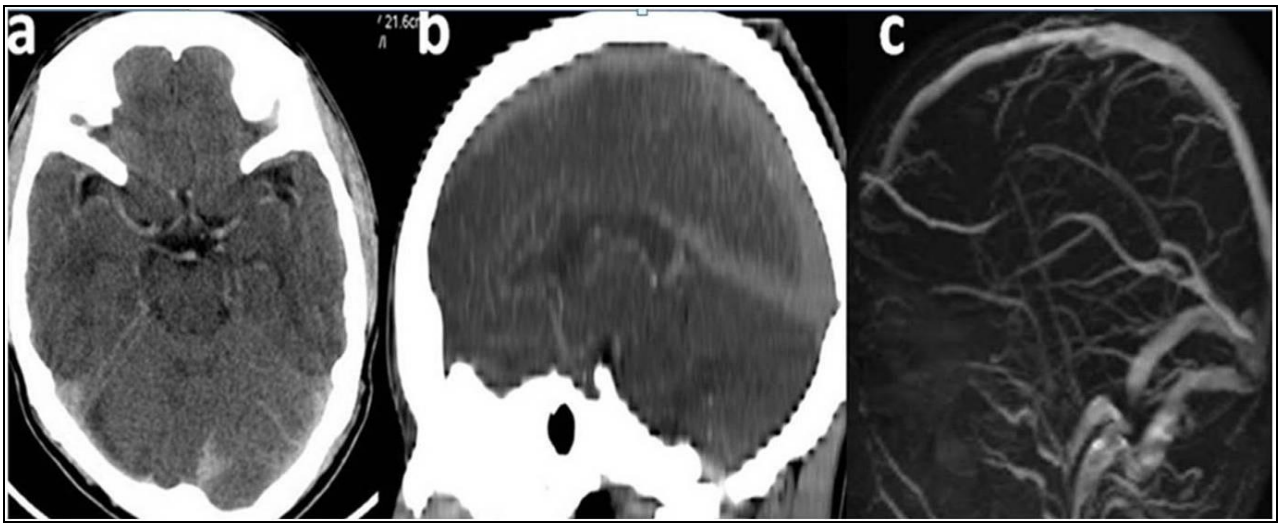

FIG. 1: NON-CONTRAST COMPUTED TOMOGRAPHY SCAN OF HEAD SHOWS HYPERDENSE CIRCLE OF WILLIS (a), HYPERDENSE SAGITTAL SINUS AND STRAIGHT SINUS (b). MAGNETIC RESONANCE VENOGRAPHY OF BRAIN SHOWS PATENT VENOUS SINUSES(c).

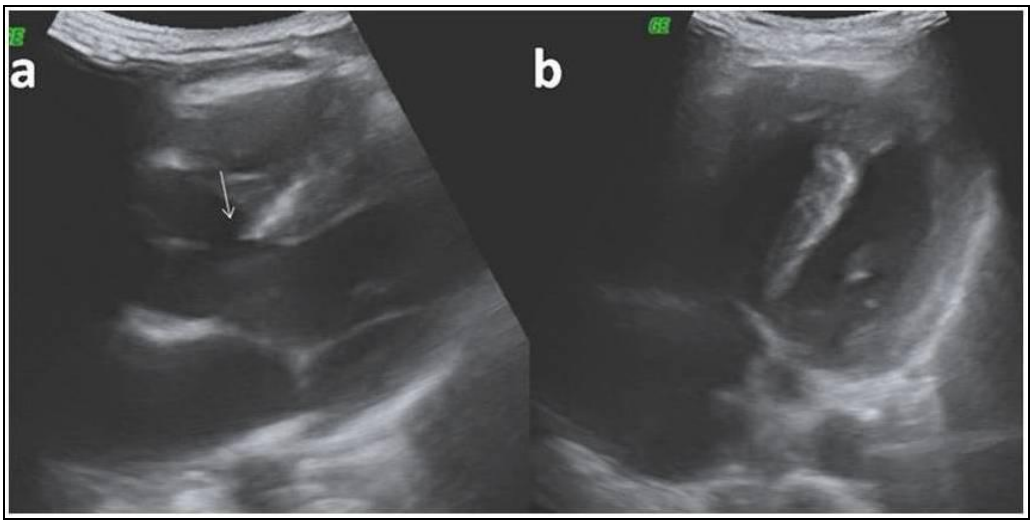

FIG.2: ECHOCARDIOGRAPHY OF THE PATIENT SHOWS VENTRICULAR SEPTAL DEFECT (a) AND RIGHT VENTRICULAR HYPERTROPHY

DISCUSSION: The hyperdense cerebral artery is well described in case of acute ischemic stroke on NCCT of head due to occluding clots.[4] In unenhanced CT image, hyperdense dural venous sinus showing CT Hounsfield unit (HU) more than 70 are usually associated with venous sinus thrombosis. [5] Hyperdense blood in patent cerebral sinus may be seen in neonates and infants, and in patients with a raised hematocrit, as might be present in polycythemia or dehydration.[6] It is observed that a hematocrit level more than 60% produces hyperattenuated-appearing Vasculature. Hypodense brain parenchyma surrounding the vessel in case of infection or tumor can give the impression of a pseudo hyperdense vessel.[7] Atheromatous vessel calcifications may show increased vessel attenuation which posses difficult to discriminate intraluminal from mural hyper densities. To establish objective criteria for hyperdense middle cerebral artery, Koo et al [8] defined a ratio of 1.2 when compared to the non-affected contralateral vessel or an absolute value of

more than 43 Hounsfield unit (HU). Our patient had no sign and symptom of dehydration, infection or cerebral sinus thrombosis such as headache and seizures.

He had congenital cyanotic heart disease (TOF) with raised hematocrit level (secondary polycythemia) which explains the hyperdense intracranial vessel in NCCT study of head. Patient with polycythemia are more prone for cerebral venous thrombosis. CT venography, MRV or catheter angiography may be done to rule out cerebral venous thrombosis.[9] In our case the MRV study revealed patent venous sinuses.

CONCLUSION: We concluded that hyperdense intracranial arterial and venous systems are seen in case of polycythemia due to raised hematocrit level. As patient with polycythemia are more prone for cerebral venous thrombosis, CT venography, MRV or catheter venography may be done to rule out early thrombosis in symptomatic patient.

REFERENCES:

1. Mair G, Boyd E V, Chappell F M, von Kummer R, Lindley R I, Sandercock P, Wardlaw J M Sensitivity and Specificity of the Hyperdense Artery Sign for Arterial Obstruction in Acute Ischemic Stroke. Stroke 2015; 46(1): 102-107.
2. Rauch RA, Bazan C 3rd, Larsson EM, Jinkins JR. Hyperdense middle cerebral arteries identified on CT as a false sign of vascular occlusion. Am J Neuroradiol 1993; 14:669–73.
3. Bora M, Kurian P, Venkatesh B P, Shivanna U. Uniform hyperdense vessels in non-contrast CT of brain: An unusual finding in plain CT scan diagnostic of polycythemia. Medical Journal of Dr. DY Patil University 2014; 7(3): 362.
4. Mair G, Boyd E V, Chappell F M, von Kummer R, Lindley R I et al .Sensitivity and Specificity of the Hyperdense Artery Sign for Arterial Obstruction in Acute Ischemic Stroke. Stroke, 2015; 46(1): 102-107.5.
5. Black D F, Rad A E, Gray L A, Campeau N G, Kallmes D F. Cerebral venous sinus density on noncontrast CT correlates with hematocrit. American Journal of Neuroradiology2011; 32(7): 1354-1357.
6. Colin S. Poon, Ja-Kwei Chang, Amar Swarnkar, Michele H. Johnson and, John Wasenko. Radiologic Diagnosis of Cerebral Venous Thrombosis: Pictorial Review. AJR 2007; 189:64–75.
7. Jha B, Kothari M. Pearls & oy-sters. Hyperdense or pseudohyperdense MCA sign: a Damocles sword? Neurology 2009; 72:e116–7.
8. Koo CK, Teasdale E, Muir KW .What constitutes a true hyperdense middle cerebral artery sign? Cerebrovasc Dis 2000; 10:419–23.
9. S Gayathri, Akhila Prasad, Namrita Sachdeva, B. P. Baruah, Shailendra Aggarwal J Pediatr Neurosci. 2010; 5(1): 27–29

How to cite this article:
Bahinipati P, Sahoo RK, Behera SK and Sahu N: Hyperdense Intracranial Vessels in Non-Contrast Computed Tomography Scan of Brain-A Case Report. Int J Pharm Sci Res 2015; 6(7): 3091-93.doi: 10.13040/IJPSR.0975-8232.6(7).3091-93.