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*Case Report*

# Brain Abscess Drainage under Scalp Block in DORV Patient

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## ABSTRACT

The double outlet right ventricle (DORV) is a rare congenital heart disease. A 12 year old child of neglected DORV presented to us for incision and drainage of cerebral abscess. The surgical procedure was performed successfully under scalp block with general anaesthesia.

***Key Words:*** Double outlet right ventricle, Brain abscess, Scalp block, Anaesthetic management.

## INTRODUCTION

The double outlet right ventricle (DORV) is a rare congenital cardiac defect with the incidence in the United States is 0.09 cases per 1000 live births and about 1-1.5% amongst congenital heart disease. Both the great arteries aorta and pulmonary artery arises from the right ventricle. [1,2] The left ventricle communicated to the right ventricle through a ventricular septal defect (VSD). The written consent had been obtained from patient relative for publication as a case report. Only few case reports of anesthetic management of patients with DORV for brain abscess drainage are published. We present a case report describing the anesthetic management of brain abscess drainage in a child with neglected DORV.

## CASE REPORT

A male child aged 12 years, weighing 20kg came for pre-anesthetic evaluation for the clearance of surgery for brain abscess drainage. He had a history of cyanotic spells, easy fatigable and failure to thrive since childhood. The child was a diagnosed case of DORV since 7 years of age but had not undergone any surgical repair and was not on any treatment. On general examination, the child was conscious, irritable and cachexic. The central and signs of peripheral cyanosis in form of clubbing grade 3 was present. His pulse rate of 110 per minute, regular in character, with blood pressure of 86/40 mmHg and the oxygen saturation was 74% on room air. Airway examination was normal with Mallampati grade 1. The apex beat was situated in the left 5$^{th}$ intercostal space at the midclavicular line. The S1, S2 heart sound and p2 were loud, along with a pansystolic murmur at the left lower sternal border. The neurological examination was normal and no signs of raised intracranial pressure were present. The heart silhouette appeared boot shaped with prominent pulmonary arteries on chest X-ray. Electrocardiogram (ECG) showed sinus rhythm and right ventricular hypertrophy. On echocardiography (ECHO) showed situs solitus, viscero-atrial concordance. Both

atria were drained into right ventricle and left ventricle was not developed opening to right ventricle through VSD, aorta and pulmonary artery arising from right ventricle with gradient 76mm Hg at pulmonary valve, common atrioventricular valve regurgitation also present (gradient 65mm Hg), ostium primum and secondum atrial septal defect (ASD) also present, pulmonary artery was narrow in caliber. Cardiac catheterization was not done. Two abscess in basifrontal lobe communicating with frontal horn of right lateral ventricle with ventriculitis, meningitis and hydrocephalus and there is midline shift along with right uncal herniation were present on contrast computed tomography (Figure 1).

His hematocrit was 51% with a platelet count of 210 × $10^9$/L. The serum electrolytes, coagulation parameters, serum urea and creatinine were within normal. The Arterial Blood Gas analysis showed pH of 7.429, $Po_2$ 41.5 mmHg, $Pco_2$ 32.8 mmHg, $HCO_3$ 22.1 mEq/L, $SpO_2$ 70.4% and base excess -0.3 on room air. Informed high risk consent obtained for general anesthesia explaining about perioperative cardiac events. The infective endocarditis prophylaxis was given prior to the surgery. The clear fluids allowed up to 2 h before surgery orally. The standard monitors was attached in form of noninvasive blood pressure, pulse-oximeter, ECG and temperature in operation theatre. The patient was receive premedication of inj.midazolam 0.5mg i.v. and inj.fentanyl 40µg with oxygen saturation monitoring. The pre oxygenation was done with 100% $O_2$. Inj.ketamine 40mg and sevoflurane 6% used to achieve adequate depth of anesthesia. Airway was maintained with I gel of 2.5 size with spontaneous ventilation. The anesthesia was maintained with 100% $O_2$ sevoflurane minimum alveolar concentration of 0.7-0.8%.A Triple lumen central venous catheter was inserted into right internal jugular vein under ultrasound guidance (USG) and arterial cannulation was done in left radial artery using 22G IV cannula. The scalp block was used to reduce the requirement of intraoperative sedation with 1% lignocaine 15 ml at frontal area. The scalp block was given with 16mL of 1% Lignocaine without adrenaline (2mL for each nerve) to block the bilateral supratrochlear, supraorbital, zygomaticotemporal, auriculotemporal nerve by anatomical landmarks. The central venous pressure was maintained between 12 to 16 mm of Hg with the help of Ringer lactate. Inj.paracetamol 300mg iv infusion used intra-operative period. Intra operative ABG values with $fio_2$ 1.0 were Ph-7.435, $Po_2$-51.2mmHg, $Pco_2$-35.2mmHg, $Hco_3$ – 24.1mEq/L, base excess – 0.3, Hct- 64%, and $O_2$ saturation of 83.4%. The surgery was lasted for 40 minutes. Patient was successfully extubated on the table after completion of procedure. The patient was conscious, oriented and able to follow verbal commands and muscle power was also adequate. Patient was monitored in PACU for three hours and shifted to the ward.

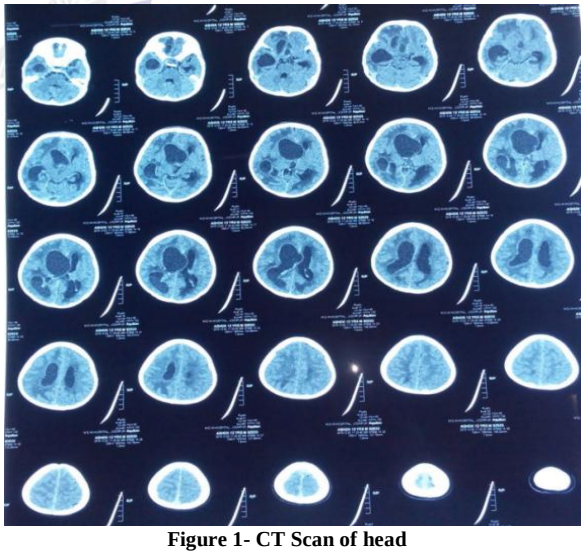

**Figure 1- CT Scan of head**

## DISCUSSION

The management of anaesthesia in double outlet right ventricle (DORV) patient provides significant challenges to the anesthesiologist. The anesthesiologist must be have through knowledgeable about the various types of DORV and formulate an anaesthetic plan based on the individuals

physiology. The Society of Thoracic Surgeons (STS) classified DORV patients into 5 types. [3]

1) VSD type: DORV associated with subaortic or doubly committed VSD
2) Tetralogy of Fallot (TOF) type: DORV associated with subaortic or double committed VSD and pulmonary stenosis (PS)
3) Transposition of great arteries (TGA) type: DORV with subpulmonary VSD (with or without PS)
4) Remote VSD type: DORV with a remote VSD (with or without PS)
5) DORV and atrioventricular septal defect (AVSD)

Our patient had DORV of TOF type. The cyanosis is more prominent in moderate to severe PS, chronic hypoxia and also adds desaturated blood to the systemic circulation, leading to almost equal pressure of the right ventricle and the systemic pressure. [4] The stenosis at pulmonary valve and presence of VSD causes the blood ejected from the right ventricle enter the aorta through left ventricle. Because of these compensatory mechanisms cardiac reserve and oxygen delivery during stressful conditions was limited. [5] Complications of long term right to left shunts include chronic hypoxia leading to pulmonary vasoconstriction, increase respiratory rate, respiratory alkalosis, polycythemia, coagulopathy, infective endocarditis and cerebral abscess due to increased risk of paradoxical emboli. The coagulation abnormalities, hydration and electrolyte imbalances should be corrected preoperatively. A thorough discussion about the planned procedure and any specific concerns with surgeon always beneficial. These patients are high-risk candidates for surgery for abscess drainage under general anaesthesia because. Hence, sometime treatment of an abscess is restricted to aspiration only under local anesthesia (LA). [6]

The general anesthesia with controlled ventilation associated with the risk of hemodynamic instability but had advantage of better oxygenation. [7] The goal of anaesthesia in our case was to maintain hemodynamic stable and avoid the changes that would increase the pulmonary vascular resistance. Prevention of dehydration is also important as it may lead to further increase in hematocrit in these patients.

In our case, patient was irritable and uncooperative so general anesthesia with I-gel would be decided as method of anaesthesia. We took preventive measures to prevent air embolism in the form of bubble trap, a cause of perioperative morbidity in patients with shunting. [8]

The ketamine used as induction agent because of its property to increase systemic vascular resistance (SVR) hence increased pulmonary perfusion and oxygenation of blood. Walker A et al was used ketamine most commonly in neonates with complex cardiac defects. The sevoflurane, isoflurane, fentanyl and midazolam infusions had no effect on the shunt fraction of children. [9]

Nowadays awake craniotomy frequently used technique for brain tumor excision. The patient tolerance to awake craniotomydepends on effective analgesia of the surgical field by the scalp block. The effective scalp block provide the haemodynamic stability and the stress response to painful stimuli. [10] The scalp block can be used as the sole technique in the adult patients without manipulation of airway. The total dose of local anaesthetic used must be calculated for individual patients with and without epinephrine. The addition of epinephrine, 1:200000 increases the total amount of local anaesthetic used, decreases bleeding, and also increases the duration of anaesthesia. However, systemic absorption of epinephrine cause tachycardia and hypertension and intra-arterial injection into the superficial temporal artery is a complication when blocking the auriculotemporal nerve. This is an anatomical block, and not just a ring block.

## CONCLUSION

The general anaesthesia with scalp block and preservation of spontaneous ventilation, advanced monitoring, facilitates better maintenance of hemodynamics, oxygenation, and control of intracranial pressure (ICP) and seizure.

***Conflict of interest***- None

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