



Post Blood Transfusion Hypertensive Encephalopathy in a Child with Congenital Hemolytic Anemia: A Case Report

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ABSTRACT

Introduction: Children having hemolytic anemias who have received multiple blood transfusions exhibit a rare complication of development of hypertension and seizures following transfusion, which may or may not be associated with intracranial hemorrhage. **Case description:** A 9-year-old boy presented with history of progressive paleness of body and weakness for the 30 days. There was a history of blood transfusion one week ago and multiple transfusions for one year of age. Examination revealed tachycardia, tachypnea, severe pallor and splenohepatomegaly. Blood work revealed a hemoglobin level of 4.0 grams with peripheral smear findings suggestive of hemolytic anemia. After blood transfusion, child complained of difficulty in breathing, vomiting and visual loss, followed by convulsions. Blood pressure was 180/110 mmHg. Seizure was controlled with intravenous midazolam and hypertension with furosemide and labetalol. CT brain was normal. As hypertension got under control, child gradually gained consciousness. **Conclusion:** A less intensive transfusion regimen among such patients along with prompt management of hypertension can prevent this potentially fatal syndrome.

Keywords: Hemolytic anemia, Hypertensive encephalopathy, Transfusion reaction

Abbreviations: aPTT: Activated Partial Thromboplastin Time; PT: Prothrombin Time

INTRODUCTION

Hemolytic anemias are very commonly encountered inherited disorders in pediatric age group. Most of these children require recurrent transfusions of blood and blood products at regular intervals in order to prevent occurrence of dreadful consequences. A rare complication in such children who have received multiple blood transfusions is development of hypertension and seizures following blood transfusion, which may or may not be associated with intracranial hemorrhage. Wasi et al., reported for the first time a rare and potentially fatal syndrome of hypertension, seizures, and intracranial bleeding in 8 thalassemic patients who had a history of receiving multiple blood transfusions [1]. Constantopoulos and Matsaniotis reported a similar case of hypertension, convulsions, and cerebral hemorrhage in a 4-year-old suffering from thalassemia [2]. Chaunsumrit et al., also reported similar findings in a child with HbE-Beta thalassemia disease [3]. Ngim et al., in 2014, too reported a case of a 14-year-old thalassemic Malay girl who had intracerebral bleed and hypertension after repeated transfusions [4]. Using the keywords 'hemolytic anemia', 'hypertension', 'seizures' and 'hemorrhage' in PubMed and DOAJ database 9-10 such cases were found in English literature. Such a case was encountered in the pediatric ward of Katihar Medical College in Bihar, India where a 9-year-old boy with features of hemolytic anemia developed hypertension and convulsions after blood transfusion, which is discussed over here.

CASE DESCRIPTION

A 9-year-old boy was admitted to the pediatric ward with history of progressive paleness of body and weakness for the last 30 days. The boy had a history of blood transfusion one week ago at a local clinic. There was also history of recurrent similar complaints since infancy for which the child had received multiple blood transfusions at various healthcare facilities, without a definite diagnosis. There was no history of hypertension, seizures, or any renal conditions in the past. The boy was born of a consanguineous marriage, but there was no history about any similar illness running in the family. Developmental milestones were achieved timely and child's diet constituted predominantly non-vegetarian foods.

At the time of admission, child was conscious and oriented to time, place, and person. Anthropometric measurements (Weight=30 Kg, Height=120 cm) suggested stunted growth. Vital parameters were taken (heart rate=126 per minute, BP=90/50 mm Hg) and general examination was done which revealed tachycardia, tachypnea and severe pallor. Abdominal examination revealed splenohepatomegaly with liver palpable 4 cm and spleen 6.5 cm below the right and left costal margins, respectively. Blood work revealed a hemoglobin level of 4.0 grams with other cell counts within normal range. Renal function tests were normal too. Peripheral smear findings were suggestive of hemolytic anemia and a reticulocyte count of 4.8% was obtained. Child was started on intravenous ceftriaxone along with packed red blood cell transfusions. Over the next 5 days, the boy received 2 transfusions of 350 ml volume each. Clinical improvement was seen, and hemoglobin level had risen to 6.8 grams. On the day of third transfusion, around mid-blood transfusion, child started complaining of difficulty in breathing, vomiting and sudden visual loss which was followed by generalized tonic-clonic convulsions. Blood pressure was 180/110 mm hg at that time. Prompt seizure control was done with intravenous midazolam and phenytoin. Hypertension was controlled with parenteral furosemide and intermittent labetalol infusion after which BP was recorded to be 90/60 mm Hg. Urgent CT brain was normal. As hypertension got under control, child gradually gained consciousness and no focal neurological deficits were noted. Further transfusion was continued while keeping the child on oral nifedipine. No similar complications were noted in the next blood transfusion. After 4 transfusions, child was discharged with normal BP and consciousness.

DISCUSSION

In this report, we have illustrated a rare syndrome of hypertensive encephalopathy post multiple blood transfusions in a child with hemolytic anemia. Similar reports have been gathered from around the world about this complication in children having thalassemia, sickle cell anemia and other hemolytic anemias.

In 1978, Wasi et al., reported various combinations of hypertension, convulsions, severe headache, and cerebral hemorrhage in 8 thalassemic patients in Thailand after they had received 3-7 units of blood in preparation for splenectomy. On Brain autopsy, changes similar to hypertensive encephalopathy were seen. Since all the episodes were reported 10-15 days after blood transfusion, it was concluded that hypertension occurred due to presence of vasopressor substances in the blood and was not a result of volume overload [1]. In 1980, Constantopoulos and Matsaniotis reported hypertension, convulsions, and cerebral hemorrhage after multiple transfusions, in a 4-year-old suffering from thalassemia. The cause of hypertension was not known, and the boy recovered after 25 days [2]. Chaunsumrit et al., in 1986 also reported similar findings in a child with Hb E/ β -thalassaemia disease [3]. In our report, although all investigations were conclusive of hemolytic anemia, but the exact cause of hemolysis could not be evaluated due to scarcity of resources and financial inability of the patient for further blood work. Chaunsumrit et al. in 1986 in their report concluded that post transfusion high plasma renin levels were responsible for hypertension in his patient [3]. On the other hand, in 1989, Thirawarapan et al., studied the mechanism of post transfusion hypertension in 11 thalassemic patients and concluded that plasma renin levels decreased after blood transfusion and returned to their normal range after few days. Hence, increased renin activity did not cause hypertension in such patients [5]. In 1995, Lee described the cause of massive intracranial bleed in 2 patients of thalassemia, within 2-3 days of blood transfusion. According to his report, both patients had decreased platelet count due to hypersplenism and increased PT and aPTT due to decreased clotting factors, which lead to multiple tiny intracranial hemorrhages initially and blood transfusion acted as a trigger to further increase it. Hypertension was thought to occur secondary to intracranial bleeding [6]. But, in 2006, again it was proposed by Wiwanitkit that hypertension was the cause of seizures and hemorrhage; and it was not the other way around. He reviewed brain autopsies of 15 such dead patients, where extensive arterial hemorrhages along with micro dissecting aneurysms were noted, which are characteristic pathological findings of hypertensive cerebral hemorrhage [7].

In 2008, another study was done by Assadi, in USA, looking for the cause of hypertension in such patients. In this study he reported that blood levels of renin, adrenaline, nor-adrenaline, and dopamine were elevated at the time of hypertensive crisis and the source of these vasopressors was blood transfusion itself. Whole blood consists of platelets too, which are the storage site of large amounts of vasopressor substances. Also, chronic anemia stimulates excessive erythropoietin production which produces large amounts of endothelin-1. This is responsible for vascular remodeling which may impair responsiveness of vessel wall to the vasoconstrictor substances [8].

In our patient, transfusion was given as 10 ml per kg per transfusion. Also, CT Brain of the child was normal. Hence,

hypertension was neither due to volume overload, nor due to presence of any pre-existing intracranial hemorrhage. Exact cause of hypertension could not be made out as blood levels of vasopressors were not evaluated.

CONCLUSION

Transfusion related hypertension and intracranial bleeds are a rare but life-threatening complication seen in children with hemolytic anemias, etiology of which is still not properly understood.

Hence, the possibility of a fatal outcome when a patient with chronic anemia is intensely transfused must always be kept in mind and regular blood pressure monitoring and prompt antihypertensive therapy may be lifesaving in such situations. A less intensive transfusion regimen among such patients can prevent this potentially fatal syndrome. The complication still needs to be researched upon further to come up with a clear cause so that prevention and definite treatment can be planned.

DECLARATIONS

Consent

Written consent has been obtained from the child's parents.

Conflicts of interest

The author has no conflicts of interest relevant to this article to disclose.

REFERENCES

- [1] Wasi, P., et al. "A syndrome of hypertension, convulsion, and cerebral haemorrhage in thalassaemic patients after multiple blood-transfusions." *The Lancet* Vol. 312, No. 8090, 1978, pp. 602-04.
- [2] Constantopoulos, A., and N. Matsaniotis. "Hypertension, convulsion, and cerebral haemorrhage in thalassaemic patients after multiple blood transfusions." *Helvetica Paediatrica Acta* Vol. 35, No. 3, 1980, pp. 269-71.
- [3] Chuansumrit, Ampaiwan, et al. "A syndrome of post-transfusion hypertension, convulsion and cerebral hemorrhage in beta-thalassemia Hb E disease: A case report with high plasma renin activity." *Journal of the Medical Association of Thailand = Chotmaihet thangphaet* Vol. 69, 1986, pp. 1-5.
- [4] Ngim, Chin Fang, Chen Siew Ng, and Nai Ming Lai. "Post-transfusion hypertension and seizure in congenital hemolytic anemia: A case report and literature review." *Journal of Tropical Pediatrics* Vol. 60, No. 3, 2014, pp. 253-56.
- [5] Thirawarapan, S.S., et al. "Study of mechanisms of post-transfusion hypertension in thalassaemic patients." *The Southeast Asian Journal of Tropical Medicine and Public Health* Vol. 20, No. 3, 1989, pp. 471-78.
- [6] Lee, K. F. "Fatal intra-cranial haemorrhage in 2 cases of beta-thalassaemia major." *Medical Journal of Malaysia* Vol. 50, 1995, p. 110.
- [7] Wiwanitkit, Viroj. "Brain pathology in a syndrome of hypertension, convulsion, and cerebral haemorrhage in thalassaemic patients after multiple blood-transfusions: A summary in reported Thai autopsy cases." *Journal of Hypertension* Vol. 24, No. 3, 2006, p. 601.
- [8] Assadi, Farahnak. "Vasoconstrictor-induced hypertension following multiple blood transfusions in children with congenital hemolytic anemia." *Iranian Journal of Kidney Diseases* Vol. 2, No. 3, 2008, pp. 132-36.