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EFFICACY OF TRANEXAMIC ACID IN SURGICAL MANAGEMENT OF VASCULAR MALFORMATIONS

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ABSTRACT

Surgical management of vascular malformations are one of the common cause of major blood loss .A loss of 20% of blood volume or more is defined as major loss . Severe bleeding often requires blood transfusion. Even when the benefits of transfusion outweighs the risk(eg: mismatched transfusion , allergic reaction, transmission of infections) strategies to minimize the use of limited resources such as blood products are essential. Blood loss which is to a great extent where in no abnormality in surgery or hemostasis is found do require pharmacological management for hemostasis .The present study was conducted on 8 pateints (i.e 2 cases of arterio venous malformations ,5 cases of venous malformation and 1 case of capillary malformation.) admitted in Department of Plastic Surgery at Narayana Medical college, Nellore. In all these cases tranexamic acid was used intra operatively and postoperatively and its efficacy was tested in minimizing blood loss and maintaining hemostasis.

KEYWORDS: Vascular malformations, Tranexamic acid, Hemostasis.

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INTRODUCTION

Vascular malformations are congenital anamolies that have devastating functional and cosmetic effects in addition to being commonly associated with pain and bleeding.[1] Vascular anomalies are among the most common congenital and neonatal dysmorphogenisis, which are separated into hemangioma and vascular malformations. They can occur in various areas throughout the body, with 60% being located in the head and neck . The true mechanism of pathogenesis of vascular malformation is still unclear.[2] A new classification ISSVA (International Society for Study of Vascular Anamolies)of these lesions recognize two distinct groups of lesions, hemangiomas and vascular malformations. Hemangiomas are usually not present at birth, proliferate during the first year of life, and then involute. In contrast, vascular malformations are always present at birth, never proliferate, and never involute. Knowledge of this classification system will facilitate the diagnosis of these lesions and lead to appropriate individualized treatment .[3] Various treatment modalities have been reported .Surgical excision vascular malformations make most surgeons hesitant to address them because torrential bleeding to death is possible if the bleeding is not well controlled.[4] Very few studies were conducted on the patients with vascular malformations to control bleeding.Heavy bleeding intraoperatively is an important complication of vascular malformations that increases mortality and morbidity. Occasionally this bleeding leads to the need for allogenic blood transfusion. Considering the potential risk of blood transfusion [5,6] various methods have been used to reduce the amount of bleeding during surgery. These methods includes intraoperative red cell salvage, local anesthesia, controlled hypotension, autologous retransfusion, and use of antifibrinolytic drugs. Antifibrinolytic drugs are readily accessible substances that promote hemostasis and reduce bleeding and prevent the need for allogenic transfusion [7,8].Tranexamic acid(Trans-4-amino methyl cyclo hexane carboxylic acid) is a synthetic derivative of amino acid lysine.used for the prompt and effective control of hemorrhage in various surgical and clinical areas[9]. It exerts its antifibrinlytic effect through the reversible blockade of lysine binding sites on plasminogen molecules. It inhibits endometrial plasminogen activator and thus prevents fibrinolysis and the breakdown of blood ciots. By inhibiting the action of plasmin the antifibrinolytic agents reduce execessive breakdown of fibrin and effect physiological hemostasis.[7,8] To the best of our knowledge this is the only study conducted to study the methods to reduce the amount of bleeding during vascular malformation surgery by using Tranexamic acid which is inexpensive and carries a farless risk of anaphylaxis compared to other antifibrinolytic drugs.[10,11].

MATERIALS AND METHODS

Prospective study of 8 patients (i.e 2 cases of arteriovenous malformation, 5 cases of venous malformation, and 1 case of capillary malformation.) were taken for study.

Method

After pre-operative complete clinical examination. MRI and Colour Doppler study were done to asses plane of swelling i.e . subcutaneous, inter or intra muscular, to know the flow to swelling i.e high flow/ low flow and also the feeding vessel . Intraoperative IV bolus administration of injection Tranexamic acid with stat dosage of 10 mg/kg body weight., followed by post operative single dose of i.v injection given .

Assessment of blood loss

a. Weighing of gauze pieces and mops pre and post operative.
b. Measuring the blood collection in suction jar and drain.
c. Estimating Hb%, PCV pre and post operatively.

RESULTS

Tranexamic acid a fibrinolytic inhibitor administered prior and post op single dosage to surgery in 8 cases of vascular malformation have showed effective hemostatis with good surgicaloutcome due to absolute blood less field intra and post operatively in all cases. Average blood loss was approximately 94ml(≤ 100 ml).No blood transfusion or any blood product transfusion was needed in any of the case in intra or post op period. Table 1 shows total blood loss during surgery measured by pre operative weight of gauge and mops post operative weight of gauge and mops and blood loss, suction on drain, pre operative heamoglobin percentage and post operative heamoglobin percentage.

TABLE I

S.No.	Cases	Pre op wt of Gauge (gms) †	Pre op wt of mop (gms) ††	Post op Wt of gauge (gms)	Post op wt of mops (gms)	Blood loss (ml) †††	Suction, Drain (ml)	Total Blood loss (ml)	Pre op Hb %	Post Op Hb%
1.	AVM	6	8	24	40	64	25	89	13.2	12.8
2.	VM	4	8	20	30	50	20	70	11.8	11.0
3.	AVM	8	12	35	65	100	15	115	12.4	11.5
4.	VM	6	8	30	32	62	30	92	13.0	12.4
5.	VM	10	12	40	60	100	20	120	12.0	11.0
6.	CM	4	8	35	45	80	10	90	12.5	11.8
7.	VM	6	8	20	40	60	25	85	12.0	11.2
8.	VM	6	8	25	45	70	20	90	11.6	10.7

† ONE BUNDLE OF GAUGE PIECES CONTAINS 5 GAUGE (WT. APPROX. 2Gms).
†† ONE MOP OF SIZE 4X4 INCH (WT APPROX. 4Gms).
†††ONE MILLIGRAM= ONE MILLILITER

AVM atreial malformation, VM venous malformation, CM capillary malformation.

DISCUSSION

Blood loss during surgery is one of the most common complication. Blood and blood products are scarce and costly. Blood transfusions have several rare but serious adverse effects[12]. World wide most people do not have access to safe blood and its products. Globally most important transfusions related risks are HIV, Hepatitis B ,C virus infections; allergic reactions; anaphylaxis due to mismatched transfusions[13]. There is reliable evidence that tranexemic acid reduces the need for blood transfusions due to its hemostatic action in surgical patients[14,15]. International multi centric randomized controlled trials using tranexamic acid in patients with traumatic bleeding was associated with significant reduction in mortality from bleeding[16]. Pre and intra operative administration of tranexamic acid was effective in controlling blood loss and improving the quality of surgical field in ortho gnathic surgery[17,18,19]. Tranexamic acid significantly reduced intra op blood loss compared with placebo in a variety of surgical

procedures including cardiac surgery with or without bypass[15,17] ‘ total hip and knee replacement and prostatectomy[19] ,[20]. Pharmaco analysis predicted that tranexamic acid was found to be more effective than desmopressin, ethampsylate, mefenamic acid[9], flurbiprofen and norethisterone [14].

CONCLUSION

Tranexamic acid is an effective and safe drug which can be used both intra and post op for a blood less field and to prevent blood loss and maintain hemostasis in surgery for vascular malformations requirement and reserving of blood and blood products can be avoided .

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