# **Original Research Article**

DOI: http://dx.doi.org/10.18203/2349-2902.isj20181570

# Risk factors of thrombophlebitis at infusion sites in patients admitted in surgical ward: a prospective observational study

Atul Kumar Singh<sup>1</sup>, Rajeev Dwivedi<sup>2\*</sup>, A. P. S. Ghaharwar<sup>1</sup>

<sup>1</sup>Department of Surgery, <sup>2</sup>Department of Anesthesiology, SSMC, Rewa, Madhya Pradesh, India

Received: 04 April 2018 Accepted: 10 April 2018

\*Correspondence: Dr. Rajeev Dwivedi,

E-mail: drrajd786@gmail.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

# **ABSTRACT**

**Background:** Peripheral venous canualation is indispensable in admitted patients in surgical ward, thrombophlebitis following infusion is seldom serious, but it effects on postoperative recovery, hospital stay and hence burden of disease are magnanimous. The main aim and objective of the study to find out the incidence of thrombophlebitis at the intravenous infusion site in surgical ward.

**Methods:** This prospective observational study was conducted on 300 patients admitted in surgical ward of S.S Medical College and associated S.G.M. hospital, Rewa (M.P.) patients selected randomly. These Patients were visited daily for any sign and symptoms at infusion site. The incidence of thrombophlebitis according to age, sex and duration of infusion were recorded. The tool designed to collect the data were socio demographic performa and observational check list.

**Results:** In total 300 patients the incidence of thrombophlebits is highest in age group of 41-50(20%), Male (64.66%) and incidence increases as the duration of infusion increased it is 100% after 5 days. The incidence of Grade -1 thrmbophlebitis (71.33%) is higher as compared to Grade- 2 (22.67%).

**Conclusions:** Thrombophelebitis is still an important ongoing problem in admitted patients in surgical ward. Incidence of grade-I thrombophlebitis is higher. It is more in male in the age group of 40-50 and duration of infusion is main causative factor for development of thrombophlebitis.

Keywords: Intravenous cannualation, Incidence, Surgical ward, Thrombophlebitis

# INTRODUCTION

In hospitalized patients up to 80% receive intravenous (IV) therapy at some time during their admission. The peripheral venous catheterization is a commonly done invasive procedure to administer medications, fluids and bio products. The most common complication associated with it is thrombophlebitis with incidence varying according to different settings (3.7%-67.24%). Thrombophlebitis is the inflammation of the vessel wall due to the formation of blood clot. Clinical signs of phlebitis are localized redness, warmth, swelling and palpable venous cord3. Over the last two decades, studies

about phlebitis have divided the riskfactors into four main groups: patient characteristics, therapy administered health professional practices and cannula characteristics.

The condition may resolve easily or proceed to complications like DVT, pulmonary embolism, septicemia, cellulitis, nodule formation or hyper pigmentation of skin. Moreover, it causes patient discomfort and insertion of a new catheter at a different site is required. The complications associated with peripheral IV cannula and IV therapy can have a devastating effect on patient's health and quality of life and also increase the costs of health care through

prolonged hospital stay and treatment. Given thrombophlebitis can put patient's safety at risk, this study is aimed to identify its incidence and associated risk factors in our local community.

### **METHODS**

This study was a prospective observational study on 300 admitted patients selected randomlyadmitted in surgical ward of S.S Medical College and associated S.G.M. hospital, Rewa (M.P.) Who had a cannula inserted, after approval by the institutional review board and ethics committee.

After taking written informed consent from hospitalized patients having inserted cannula. These patients interrogated, in detail to record history, observation and clinical findings were recorded in prescribed proforma.

Site and surroundings of vene-puncture were observed daily for any sign and symptoms of thrombophlebitis during or after infusion.

- Pain or Discomfort
- Tenderness.
- Erythema (Redness)
- Swelling
- Blockage of Vein
- Cord like thickening of vein

The severity of thrombophlebitis was graded according to the sign and symptoms, in their grade. 4,5

Grade -I: Pain and Tenderness

Grade -II: Redness, Swelling and Blockage of Vein.

Grade -III: Cord like thickening of vein.

Grading of scale suggested by Bhandari et al. was originally used to grade trombophlebitis among children. There may be difference in its application for grading thrombophlebitis among adult patients. We are able to identify another grading scale from Infusion Nurses Society during the preparation of this manuscript.

#### Exclusion criteria

Unconscious patients and haemodynamicaly unstable patients were excluded from this study.

Descriptive statistics used to analyze the variable, frequency and percentage.

## **RESULTS**

A total of 300 admitted patients with insert cannula were successfully recruited for this study. On analysis following observation were recorded.

Table 1: Incidence of thrombophlebitis with relation to gradation of thrombophlebitis.

Gradating of thrombophlebitis	No. of patients	Percentage
1	214	71.33
2	68	22.67
3	18	6
Total	300	100

Incidence of thrombophlebitis with relation to gradation of thrombophlebitis.

Table 2: Incidence of thrombophlebitis in relation to age.

Age group in year	No. of patients	Percentage
0-10	21	7
11-20	40	13.33
21-30	37	12.34
31-40	49	16.33
41-50	60	20
51-60	50	16.67
61-70	28	9.33
71-80	15	5
Total	300	100

The incidence of Grade-I thrombophlebitis is higher as compared to Grade-II.

Table 3: Incidence of thrmbophlebitis in relation to sex.

Sex	No. of patients	Percentage
Male	194	64.66
Female	106	35.34
Total	300	100

The incidence is highest in age group of 41-50 (20%) years while it is lowest in age group of 71-80 (5%).

Table 4: Incidence of thrmbophlebitis in relation to duration of infusion.

Duration of infusion (in days)	No. of patients	Percentage
<1	5	2
1	57	19
2	168	56
3	251	87
4	292	97
>5	300	100

This shows that Incidence of thrmbophlebitis is higher in male 64.66% as compare to Female 35.34%.

In this study we found a significant increase in incidence of thrombophlebitis as duration of infusion increases. It is almost 100% after 5 days, while 2% if infusion last less than one day.

#### **DISCUSSION**

Thrombophlebitis is the most common complication of intravenous catheters and can lead to many complications and increased costs. It is now established that the etiology of thrombophlebitis is multifactoial. Various physical, biochemical, bacteriological, experimental and physiological studies have been performed to assess the pathophysiology and to decrease the incidence of Thrombophlebitis.

We graded thrombophlebitis observed into three grades, among them the incidence of grade-I (71.33%) is higher as compared to grade-II (22.67%) and grade-III (6%). Similarly, Wilkinson young Tan J et al also observed that mild grade of thrombophlebits was the commonest.<sup>6</sup> However, it is important to note that most cases of thrombophlebitis were detected and preventive measures taken before moderate to severe thrombophlebitis developed.

For difference in risk and incidence of thrombophlebits in different age groups of patients it was observed in this study maximum incidence found in age group of 40-50 (20%) and lower in extremes of ages. Similarly, Singh et al also found in his study the incidence is highest in age group of 21-40 and 41-50, so this study suggests taking special care if the patients is between these ages.<sup>7</sup>

The incidence of thrombophlebitis in male (64.66%) is higher than female (35.34%). Similarly, Singh et al also found in his study the incidence is highest in male as compared to female.<sup>7</sup> However, our data did not provide sufficient statistical evidence to prove and validate this result. This result differed from Cicolini and Tagalkis study.<sup>1,8</sup>

A catheter that is used for infusion and duration a catheter is left in the vein was significantly influence the incidence of thrmbophlebitis. This may be due to the type of solutions infused through the catheter. Certain infusates such as antibiotics, chemotherapeutic drugs, solutions of low pH and high osmolarity are associated with increased risk of thrombophlebitis.1in this study we have found incidence is almost 100% after 5 days, while 2% if infusion last less than one day. Similar findings have previously been reported by Uslusoy and Barker. 9,10

The duration of catheterization is the only modifiable risk factor identified. The result of many studies has shown that the risk of thrombophlebitis increases with increased duration of catheterization. A randomized clinical trial in Scarborough, UK has found that there was a significant reduction of thrombophlebitis incidence when catheter was electively replaced. Thus, it is recommended the catheter should be removed or replaced in a different site

after 72 hours of insertion even when there is no sign of thrombophlebitis. 11-13

#### **CONCLUSION**

Authors confirmed an increased risk of developing thrombophlebitis among Male patients in the age group of 41-50, increased duration of catheterization and the usage of the catheter for infusion.

The practice of electively replacing catheter every 72 hours recommended for all adult patients. All patients with venous catheter should be examined for signs of thrombophlebitis at least once daily. A suitable pheripheral vein catheter chart should include date of catheterization, development of warmth, erythema, tenderness and a palpable venous cord by healthcare personel.

Funding: No funding sources Conflict of interest: None declared Ethical approval: Not required

#### REFERENCES

- 1. Sharifi J, Ghavami F, Nowrouzi Z, Fouladvand B, Malek M, Rezaeian M, et al. Oral versus intravenous rehydration therapy in severe gastroenteritis. Arch Dis Child. 1985;60:856-60.
- 2. Oliveria AS, Parreira PM. Nursing intervention and peripheral venous catheter related phlebitis. Systemic literature review. Referencia: Scientific J Health Sci Res Unit: Nursing. 2010;3(2):137-47.
- 3. Jackson A. Infection control: a battle in infusion phlebitis. Nursing Times. 1998;94:4:68-71.
- 4. Bhandari B, Joshi T, Tak SK. Anti –cogulant in the prevention of post- infusion thrombophlebitis in children. Indian Paeditr. 1979;46:289-94.
- Infusion Nurses Society Standards of Practice. Vascular access device selection and placement. J Infus Nurs. 2012;S37
- 6. Yoong W, Jo Y, Sulaiha S. Risk factors of peripheral venous catheterization thrombophlebitis. Int J Sc, Med Edu [online]. 2012;6(1):24-30
- 7. Singh R, Bhandary S, Pun KD. Peripheral intravenous catheter related phlebitis and its contributing factors among adult population at KU Teaching Hospital. Kathmandu Unive Med J. 2008;6(4):443-7.
- 8. Cicolini G, Bonghi AP, Di Labio L, Di Mascio R. Position of peripheral venous cannulae and the incidence of thrombophlebitis: an observational study. J Adv Nurse. 2009;65:1268-73.
- 9. Uslusoy E, Mete S, Predisposing factors to phlebitis intravenous catheters: a descriptive study. J Am Ac Nurse Pract. 2008;20:172-80.
- 10. Monreal M, Quilez F, Rey-Joly C, Rodriguez S, Sopena N, Neira C, Roca J. Infusion phlebitis in patients with acute pneumonia: a prospective study. Chest. 1999 Jun 1;115(6):1576-80.

- 11. Regueiro MP, Souto BR, Iglesias MM, Outón IF, Cambeiro JN, Pértega SD et al. Pheripheral venous catheters –incidence of thrombophlebitis and its determining factors. Revista de Enfermeria. 2005;28(10):21-8.
- 12. Ferreira LR, Pedreira ML, Diccini S. Phlebitis among neurosurgical patients. Acta Paulista de Enfermagnem. 2207;20(1):30-6.
- 13. Mermel LA, Maki DG. Infectious complications of swan- Ganz pulmonary artery catheters,

Pathogenesis, epidiomology, prevention and management. Am J Respir Crit Care Med. 1994;149:1020-3.

Cite this article as: Singh AK, Dwivedi R, Ghaharwar APS. Risk factors of thrombophlebitis at infusion sites in patients admitted in surgical ward: a prospective observational study. Int Surg J 2018;5:1781-4.