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Traumatic Subdural Hemorrhage – Chemoprophylaxis For VTE.

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Abstract:
Background: *VTE is well known complication of patients with subdural hemorrhage and is well documented in much recent literature with incidence up to 34% in absence of chemoprophylaxis.*
Objective: *To find the efficacy of chemoprophylaxis and factors to affecting VTE within 12 hours of SHD.*
Methods: *This is a Retrospective analysis consisting of patients with subdural hemorrhage presenting to a tertiary care trauma center within 12 hours of injury. These set of patients were compared to another set of matched patients who received Enoxaparin with delayed presentation (24hr to 48 hr). All patients were subjected to CT scan at presentation and base line venous status of lower limbs as per standard trauma protocols. Primary outcome was measured as expanding SDH. Secondary outcome includes craniotomy surgery and mortality.*
Results: *Total 564 patients were included in this study, 188 (33%) received chemoprophylaxis within 12 hr of admission. All patients were equally matched considering all permutations. The primary outcome in early set was in 18%, when compared to delayed set with 17% (p=0.83). Invasive procedure was inevitable in thirty patients in early set (16%) comparing to delayed set, where 70 (19%) were subjected to invasive procedure (p=.38). VTE was detected in 10 (1.7%) patients during their hospitilisation, of which early chemoprophylaxis was given 4 patients (p = 0.75). Mortality rate was similar in both groups.*
Conclusion: *VTE chemoprophylaxis is safe and should be initiated early (<12 hr) in traumatic subdural hemorrhage. Multicentre prospective Meta analytic studies are further required to ensure this protocol.*
Keywords: *Venous Thromboembolism, Chemoprophylaxis, Traumatic Subdural Hemorrhage.*

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I. Introduction

Subdural hemorrhage (SDH) causes major morbidity and mortality, requiring Neuro ICU treatment and close monitoring [(1-2)]. Patients with polytrauma require even more special care and attention. Venous thromboembolism (VTE) is a common and dangerous complication in this study. Other studies have reported morbidity and mortality varying from 12% to 50% when chemoprophylaxis is not given early [(1-4)]. Though this is a known fact many surgeons hesitate to initiate chemoprophylaxis fearing increase of SDH [(1-4)]. Many hospitals have different protocols regarding the timing of chemoprophylaxis for VTE.

Subdural hemorrhage may be a risk factor for venous thromboembolism. Further it is not clear whether it is safe to install chemoprophylaxis prior to repeat computed tomography (CT) scan.

The basic study design is an experimental retrospective systematic literature review. Objective of this study was to find the efficacy of chemoprophylaxis and factors to affecting VTE within 12 hours of SDH.

II. Methods

This is a Retrospective analysis consisting of 1128 consecutive patients aging more than 20 years, with stable subdural hemorrhage on initial CT scan, presenting to a tertiary care trauma center from June 2010 to July 2016 within 12 hours of injury were reviewed. Patients requiring immediate surgery, expanding unstable SDH on CT, having multiple comorbids, polytrauma, patient with bleeding diathesis were excluded from this study. All variables were analysed including age, gender, Glassgow coma scale (GCS), SDH severity score (SSS), blood pressure, CT findings. All patients received 2500-IU Enoxaparin (low molecular weight heparin) every 12 hourly.

These set of patients were compared to another set of matched patients who received Enoxaparin with delayed presentation (24hr to 48 hr). All patients were subjected to CT scan at presentation and base line venous status of lower limbs as per standard trauma protocols. Primary outcome was measured as expanding SDH. Secondary outcome includes craniotomy surgery and mortality. Majority of patients in this study had mild to stable SDH 81.6% with GCS $\geq$ 13.

Statistical analysis was computed using XL stat (2015). Propensity-score matching was used to reduce imbalances in the baseline characteristics between patients who were started on chemical prophylaxis within 12 hr of admission and those who were started *24*-48 hr after admission. To examine the baseline characters for two set groups 1:2 algorithm with 0.2 times standard deviation matching, the Mann–Whitney *u*-test was used.

III. Results

Total 564 patients were included in this study, 188 (33%) received chemoprophylaxis within 12 hr of admission. All patients were equally matched considering all permutations to the second group consisting of 376 patients who received chemoprophylaxis varying from 24 hr – 48 hr after injury.

	GROUP 1 (<12 HR)	GROUP 2 (24HR – 48 HR)
NUMBER	188	376
MEAN AGE	55.0	53.2
MEAN SSS	13.9	15.3
GCS	13.1	13.2
REPEAT CT FINDINGS	NO ENHANCEMENT OF SDH	NO ENHANCEMENT OF SDH
PRIMARY OUTCOME	18%	17%
SECONDARY OUTCOME	16%	19%

TABLE-1: SHOWING RESULT ANALYSIS IN THIS SERIES.

The mean age and gender was similar in two groups respectively (55.0 versus 53.2; p=0.45), gender (p=0.49). The GCS scores were comparable (13.1 versus 13.2; p=0.71). The SDH severity score (SSS) (13.9 versus 15.3; p=0.28). The primary outcome in early set was in 18%, when compared to delayed set with 17% (p=0.83). Invasive procedure was inevitable in thirty patients in early set (16%) comparing to delayed set, where 70 (19%) were subjected to invasive procedure (*p*=.38).

	GROUP 1 (<12 HR)	GROUP 2 (24HR – 48 HR)
VTE	10	34
MORTALITY	4.1%	3.7%

TABLE-2: SHOWING RESULT ANALYSIS FOR VTE AND MORTALITY

VTE was detected in 10 (1.7%) patients during their hospitilisation, of which early chemoprophylaxis was given 4 patients (p = 0.75). Mortality rate was similar in both groups (4.1% versus 3.7%, p = 0.83). Variance was not calculated as they were similar. There were no variable effects that fell much farther than two standard deviations away from what would have been expected which would be considered statistically significant.

IV. Discussion

In subdural hemorrhage the most dreadful complication is VTE [2-6]. In many other studies patients who have not been subjected to chemoprophylaxis, VTE was reported as high as 62 % and with increase in incidence by 4 to 5 folds [6-8]. At present there are no fixed optimal guidelines for chemoprophylaxis initiation in trauma patients. Though this is a known fact many surgeons hesitate to initiate chemoprophylaxis fearing increase of SDH [1,6,9-11]. Many hospitals have different protocols regarding the timing of chemoprophylaxis for VTE.

Previous studies report varying incidence (4% to 12%) of VTE who have received Enoxaparin within 48 to 72 hr [11-14] of a severe SDH. Stable SDH did not increase with the advent of chemoprophylaxis in this series and previous studies. There was a significant decrease in the rate of VTE. Furthermore we should ensure CT scan stability of SDH prior to chemoprophylaxis [14].

In this study early chemoprophylaxis (<12hr) lead to safe outcome. There was no expansion in primary SDH, the need for invasive procedures and secondary outcome was less in this study. The same pattern was also observed in clinical presentation and GCS, requiring less hospital stay. The two groups were nearly similar including demographics, clinical presentation, GCS, stable SDH (SSS scores), outcomes. The rate of VTE is also less as compared to the previous studies.

This study has large analysed data when compared to any other previous studies with low incidence regarding VTE chemoprophylaxis for SDH. We further calculated the standard clinical and GCS which shows the severity of head injury. The need for invasive procedures and secondary outcomes were not similar in two groups, necessitating early chemoprophylaxis. Retrospective study is the main limitation of this series, lacking randomization and there may be confounders that were not captured in analysis [15]. This series has mild SDH into consideration (GCS>13), which may mask another group of patients who have severe SDH and low GCS and on other risk factors [16].

V. Conclusion

VTE chemoprophylaxis is safe and should be initiated early (<12 hr) in traumatic subdural hemorrhage. Multicentre prospective Meta analytic studies are further required to ensure this protocol.

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