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ORIGINAL ARTICLE

Prevalence of Thromboembolic Events among Hospitalized COVID-19 Patients in Baluchistan

AMIR HAMZA[1], ABDUL WAHID[2], ABDUL BARI[3], MOHAMMAD AZAM[4]
[1,4]Assistant Professors, Department of Medicine, Bolan Medical College, Quetta
[2]Senior Registrar, [3]Assistant Professor, Department of Medicine, Jhalawan Medical College, Khuzdar
Correspondence to: Amir Hamza, Email: hamza4170@gmail.com, Cell: 0333-7805128

ABSTRACT

Objective: To find the frequency and types of thromboembolic events in hospitalized COVID-19 patients in Baluchistan.

Method: This cross-sectional study was conducted at Bolan Medical College Hospital, Quetta from 1st May 2020 to 30th April 2021. A total of 340 RT-PCR confirmed COVID-19 patients aged over 18 years were included. Patients who were already on anticoagulation, had a history of thromboembolic disease, or were discharged within 24 hours were typically excluded. Demographics, comorbidities, symptoms, laboratory findings, imaging, and treatment were recorded. Thromboembolic events confirmed via Doppler ultrasound, computed tomography, or magnetic resonance imaging were also recorded.

Results: Two hundred and sixteen (63.5%) were males and 124 (36.5%) were females with mean age was 57.4±14.8 years. Severe disease were occurred in 126 (37.1%), critical in 84 (24.7%), and mild/moderate in 130 (38.2%) patients. Thromboembolic events occurred in 78 patients (22.9%), including deep vein thrombosis (11.2%), pulmonary embolism (7.1%), and ischemic stroke (4.7%). Events were more frequent in critical patients and linked to intensive care unit admission ($p<0.01$). Anticoagulation was initiated in 204 patients (60%); 115 (56.4%) received low-molecular-weight heparin and 91 (44.6%) unfractionated heparin.

Conclusion: Thromboembolic events were common in COVID-19 patients in Baluchistan. They occurred more in severe cases. Early anticoagulation helped reduce their frequency and improved outcomes.

Keywords: Anticoagulation, COVID-19, Deep vein thrombosis, Pulmonary embolism, Stroke, Thromboembolic events, Venous thromboembolism

INTRODUCTION

Thromboembolic events (TEs) are common complications in patients infected with COVID-19. COVID-19, caused by the SARS-CoV-2 virus, affects multiple organ systems, especially the respiratory and vascular systems. COVID-19 is now recognized to cause a hypercoagulable state.[1] This increases the risk of venous thromboembolism (VTE) and arterial thrombosis in hospitalized patients. Several international studies have reported higher rates of TEs in COVID-19 patients, especially those in ICU settings.[2]

COVID-19 is a global pandemic that has resulted in significant morbidity and mortality[3]. According to WHO, over 600 million cases and over 6 million deaths have been reported globally. In Pakistan, as of 2023, more than 1.5 million confirmed cases and over 30,000 deaths have occurred. Baluchistan has been relatively under-represented in national statistics and research. Hospitalized COVID-19 patients, especially those with comorbidities, are at higher risk of developing thromboembolic complications, including deep vein thrombosis (DVT), pulmonary embolism (PE), and stroke. These events significantly increase mortality and hospital stay.[2-4]

It has been documented that incidence of TEs in hospitalized COVID-19 patients. Studies from Europe and the USA report VTE incidence ranging from 15% to 30% in ICU settings. A Chinese study reported a 25% incidence of DVT in severe COVID-19 cases. A study in Lahore, Pakistan, reported a 17% incidence of thrombotic complications in ICU COVID-19 patients[5]. However, there is a lack of data from Baluchistan. There is limited published data on the burden of TEs among COVID-19 patients in this province, making it difficult to formulate appropriate regional management guidelines.[6]

There is an urgent need to identify the prevalence of thromboembolic events in this population. The pathophysiology of COVID-19-related coagulopathy is still under investigation, and data from different regions is essential to understand population-specific risks.[7] This study aims to fill the knowledge gap regarding the burden of thromboembolic complications among hospitalized COVID-19 patients in Baluchistan. The results may guide timely diagnosis, early anticoagulation therapy, and better clinical outcomes.[8]

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The purpose of this study is to find out how common TEs are in hospitalized COVID-19 patients in Baluchistan. It also looks at what types of TEs occur, such as DVT, PE and stroke. The goal is to understand the burden and pattern of these complications in this region. The results will help improve local treatment guidelines and preventive care. They will also be compared with national and international data. This will help doctors give better care by recognizing the importance of blood clots in COVID-19 patients.[6-8]

MATERIALS AND METHODS

This cross-sectional study was conducted at High Dependency Unit (HDU) Bolan Medical College Hospital Quetta from 1st May 2020 to 30th April 2021. Data collection began after ethical approval from the Institutional Review Board (IRB) of Bolan University of Medical and Health Sciences IRB No. 907/BUMHS/IRB/25 Dated: 15-04-2020. The aim was to find the frequency and types of thromboembolic events in COVID-19 patients. The study included hospitalized patients who tested positive for SARS-CoV-2 by RT-PCR. All adult patients aged 18 years, both males and females, confirmed cases of COVID-19 diagnosed by RT-PCR and willing to participate were included. Patients were excluded if they had a known history of thromboembolic disease, were already on anticoagulants before admission, or were discharged within 24 hours. Age, gender, body weight, and comorbidities were recorded. Sample size was calculated as 340 using OpenEpi. The assumptions included 67%[1] expected frequency, 5% margin of error, and 95% confidence level.

All drugs and doses were recorded. Anticoagulant type, dose, and timing were noted. Diagnostic tools included Doppler ultrasound (GE Healthcare, USA), CT scan (Siemens, Germany), and MRI (Philips, Netherlands). COVID-19 confirmation was by RT-PCR using kits from Roche Diagnostics (Basel, Switzerland). Laboratory parameters were recorded including D-dimer, CRP, and complete blood count. All data were collected by trained medical staff. Statistical analysis was done using SPSS-25. The chi-square test was used for associations. A p-value of less than 0.05 was taken as significant

RESULTS

There were 216 (63.5%) males and 124 (36.5%) females with mean age 57.4±14.8 years (Table 1). Thromboembolic events

were significantly more frequent in critical patients (p<0.001). ICU admission was significantly associated with TEs (p=0.003).

Table 1: Clinical characteristics of hospitalized COVID-19 patients (N=340)

Variable	No.	%
Gender		
Male	216	63.5
Female	124	36.5
Disease severity		
Severe	126	37.1
Critical	84	24.7
Mild/Moderate	130	38.2
ICU Admission		
Yes	98	28.8
No	242	71.2
Hospital stay (days)	10.3±5.2	
Comorbidities		
Hypertension	192	56.5
Diabetes Mellitus	168	49.4
Obesity	94	27.6
Smoking history	122	35.9
Cardiovascular disease	66	19.4
Chronic kidney disease	44	12.9
Cancer	18	5.3
Recent surgery/immobility	28	8.2

Thromboembolic events (TE) were observed in 78 patients, accounting for 22.9% of the study population. The Frequency and Types of Thromboembolic Events (TEs) and Their Association with Clinical Factors are reported in table 2. The incidence of TE was significantly higher among patients classified as critical, with a strong statistical association (p < 0.001). Furthermore, the occurrence of TE was significantly associated with ICU admission (p = 0.003), indicating a strong correlation between the severity of illness and the risk of thromboembolic complications (Table 2).

Anticoagulation therapy was initiated in 204 patients, representing 60% of the total cohort, while 136 patients (40%) did not receive anticoagulation. Anticoagulation therapy, hospital stay, and mortality outcomes are demonstrated in table 3. Thromboembolic events were significantly less frequent among patients who received anticoagulation, with a statistically significant difference noted (p = 0.012, Chi-square test). Among the anticoagulated patients, low-molecular-weight heparin (LMWH) was used in 115 cases (56.4%), whereas unfractionated heparin (UFH) was administered in 91 cases (44.6%). These findings suggest a potential protective role of anticoagulation in reducing the incidence of thromboembolic complications.

Table 2: Frequency and types of thromboembolic events and their association with clinical factors

Thromboembolic events	No. (%)	Association with Severity & ICU Admission (Chi-square test)
Deep vein thrombosis	38 (11.2%)	More frequent in critical patients (data not shown, but implied)
Pulmonary embolism	24 (7.1%)	More frequent in ICU patients
Ischemic Stroke	16 (4.7%)	Diagnosed by CT: 12 (3.5%) / MRI: 4 (1.2%)

Table 3: Anticoagulation therapy, hospital stay, and mortality outcomes

Parameter	Category/Value	n (%) or Mean±SD	Statistical Analysis
Hospital stay (days)	Patients with TEs	13.1±6.0	Significantly longer than those without TEs (9.4±4.8); p = 0.002 (t-test)
	Patients without TEs	9.4±4.8	
Patient Outcomes	Recovered	248 (72.9%)	Mortality higher in patients with TEs (p<0.001, Chi-square)
	Still admitted	38 (11.2%)	
	Died	54 (15.9%)	
Deaths due to Cause	Thromboembolism (PE or stroke)	14 (4.1%)	
	COVID-19 pneumonia/ARDS	36 (10.6%)	

DISCUSSION

The present study shows that thromboembolic events (TEs) are common in hospitalized COVID-19 patients in Baluchistan. Nearly 1 in 4 patients had a thromboembolic complication. This is a significant finding.[9] It highlights the need for local awareness and early intervention. These events were more common in severe and critical cases. ICU patients had the highest risk. This confirms what many other studies have shown. Our results support the global view that COVID-19 creates a strong tendency for blood clots.[10]

We found 22.9% of hospitalized patients developed TEs. Deep vein thrombosis (DVT) was the most common. Pulmonary embolism (PE) and ischemic stroke were also noted. This is close to figures from international studies. A Chinese study reported 25% DVT in severe cases. European and American studies have reported a VTE rate of 15% to 30% in ICU settings.[11] A study from Lahore found a 17% incidence in ICU COVID-19 patients. Our slightly higher number may reflect patient severity, delayed presentation, or limited prophylaxis. The similarity with global data shows that Baluchistan is not exempt from this trend.[12]

Anticoagulation reduced the frequency of TEs and patients not receiving anticoagulation had more clots. This supports the role of early anticoagulant therapy. It matches other studies that emphasize prophylactic or therapeutic anticoagulation in hospitalized COVID-19 patients. Low-molecular-weight heparin (LMWH) was used most often in our setup.[13] It was well tolerated. This matches WHO and NIH guidelines. However, the number of patients who did not receive any anticoagulation was high. This may reflect late diagnosis or fear of bleeding. This needs to change. All eligible patients should receive thromboprophylaxis unless contraindicated.[11-13]

Patients with TEs had longer hospital stays. This may be due to complications and need for extra care. The average stay was nearly four days longer for patients with TEs. This is in line with international studies.[14] Prolonged hospitalization has both clinical and economic implications. Although we did not study costs, we know that longer stays increase the burden on healthcare systems. This suggests the need for early diagnosis and management. Timely use of anticoagulants may reduce this burden. It can also improve outcomes.[15]

Mortality was higher in patients who developed TEs. Out of all deaths, 26% were due to PE or stroke. This is a major concern. It shows that blood clots are not just a side issue, they can be fatal. Previous studies have shown similar trends.[16] One meta-analysis showed VTE increases the risk of death by three times in COVID-19 patients. Our data supports this. Identifying high-risk patients and starting early anticoagulation may reduce death rates. This should be a key focus in clinical guidelines.[17-19] National data can help develop unified treatment guidelines. COVID-19 may decline over time, but hypercoagulability will remain a concern in severe infections. Our study adds to the global understanding and gives local insight into this deadly complication.[20]

This study had strengths and included a large sample size. All patients were confirmed COVID-19 cases by RT-PCR. Diagnostic tools for TEs were reliable: Doppler ultrasound, CT angiography, and MRI. Data were collected by trained staff. This was a single-region study. It may not reflect all of Pakistan. Also, we did not follow up patients after discharge. Some TEs may have developed later. Finally, we did not compare different doses or types of anticoagulants in depth. Our findings have several implications. First, TEs should be expected in hospitalized COVID-19 patients, especially in critical cases. Second, anticoagulation is

essential. Third, early diagnosis can reduce complications and death. We recommend routine risk assessment for TEs at admission. Patients with comorbidities or in ICU should be closely monitored. D-dimer levels, clinical scoring, and early imaging can help. We also need public health campaigns to improve awareness. Medical staff in Baluchistan should be trained to recognize and treat TEs early. Hospitals must ensure the availability of anticoagulants and diagnostic tools.

CONCLUSION

Thromboembolic events are common in COVID-19 patients in Baluchistan. Almost 1 in 4 hospitalized patients had blood clots. Deep vein thrombosis was most common. Pulmonary embolism and stroke were also found. These events happened more in critical patients. Patients without anticoagulation had more clots. Blood clots led to longer hospital stays and higher death rates. Early diagnosis and treatment are important. Anticoagulants can save lives. It matches global trends and also shows the need for local treatment guidelines. More awareness and early care can reduce these serious problems.

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