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Survival Trends in Hepatocellular Carcinoma Patients with Portal Vein Tumor Thrombosis, A 3-Month Outcome Assessment

Sajan Sawai[1], Dolat Singh[2], Shabana Lakho[3], Hira Laghari[4], Sadia Nizamani[5] Mohsin Ali[6]

[1,6]Assistant Professor of Gastroenterology, Indus Medical College TM Khan
[2,,4, 5]Assosiate Professor of Medicine, Indus Medical College TM Khan
[3]Assistant professor of Gastroenterology, CMCH Larkana

Author`s Contribution

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Address of Correspondent
Dr Sajan Sawai
Assistant professor of Gastroenterology, Indus Medical College TM Kahn
drsaajansawai@gmail.com

ABSTRACT

Objective To assess the survival trends among hepatocellular carcinoma (HCC) patients presenting with portal vein tumor thrombosis (PVTT) over a 3-month period.

Methodology: This descriptive case series study was conducted at Gastroenterology and hepatology department of Asian Institute of Medical Sciences, Hyderabad from March 2019 to September 2019. Patients of all age groups, both genders diagnosed with hepatocellular carcinoma based on ultrasonography and CT scan imaging as well as screening alpha fetoprotein levels, with evidence of portal vein tumor thrombosis (PVTT) detected through imaging modalities and patients with available medical records containing relevant clinical, laboratory, and imaging data were included. To monitor the survival status of patients, a three-month follow-up period was initiated, facilitated through regular follow-up and phone contact. Throughout this follow-up period, records were maintained, and all relevant data were entered and analyzed using SPSS version 26.

Results: The mean age of the patients was 56.4 years, with a standard deviation of 5.7 years. Average Body mass index (BMI) was 23.4 kg/m². Majority of participants were male 80.0%, while females were 20.0%. Regarding the three-month survival rate, only 17.5% of the patients were found to have survived during and remaining patients did not survive. The three-month survival rate did not show statistically significant differences across various demographic factors such as patients' age, gender, and BMI categories ($p \geq 0.05$).

Conclusion: Study revealed poor survival outcomes among patients diagnosed with portal vein tumor thrombosis associated with hepatocellular carcinoma, with only 17.5% of patients surviving rat. The overwhelming majority, died to this aggressive malignancy within the observed timeframe.

Key words: HCC, portal vein tumor thrombus

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Introduction

Globally, hepatocellular carcinoma (HCC) is the most common type of malignancy of the liver,[1] ranking sixth globally and ranking third in terms of the primary cause of cancer-related deaths in 2020.[2] HCC was once thought to be a tumor with a typically poor prognosis because of its rapid growth and aggressiveness, which frequently led to an advance stage of detection.[3] HCC develops in 44% of people with a persistent HBV infection and 21% of people with the infection of HCV.[2] However consuming a lot of alcohol increases the chance of HCC development by up to 26%.[2] Approximately 20% of people having HCC survived for five years; nevertheless, the rate of survival fluctuates based on the stage of the disease and its treatment.[4]

Different approaches to therapy may possibly account for the variation in HCC survival rates that are seen in a small number of developed nations.[5] There are notable variations in the incidence and mortality rates of HCC between nations, but little is known about how the disease is treated

in different parts of the world.[5] The survival rate serves as a critical health metric crucial for assessing both diagnostic and treatment initiatives.[6] The initial stride in mitigating the impact of cancer within any community involves comprehending its prevalence, alongside gathering data on cancer types, locations, incidence, and survival rates.[6]

However, as hepatic cancer ranks among the foremost causes of cancer-related mortality in the United States, often complicated by portal vein tumor thrombus, signaling an advanced stage of the disease with a limited life expectancy.[7] Approximately 30% of HCC patients have concurrent portal vein tumor thrombus (PVTT),[8] which appears to be terminal stage HCC. Portal vein tumor thrombosis (PVTT) stands as the predominant type of macrovascular invasion associated with HCC, affecting between 10% to 60% of patients.[9]

HCC accompanied by PVTT typically manifests with deteriorating liver function, susceptibility to blood metastasis, increased occurrence of complications linked to portal hypertension, and reduced tolerance to treatment compared to cases without PVTT.[10] The mean survival period for patients with untreated HCC is 2.4-4 months compared with 24.4 months for patients with untreated HCC who do not have PVTT.[8,10] It has been reported that among the 484 individuals, 36.8% had portal vein tumor thrombus (PVTT), according and patients with PVTT had a significantly shorter median survival time of 7.2 months compared to patients without PVTT 35.7 months (P-0.001).[11] Despite the extensive body of research on HCC, there has been a lack of local studies evaluating the survival rate of portal vein thrombosis in HCC. Thus, this study aimed to determine the three-month survival rate among patients with HCC and portal vein tumor thrombosis. Its objectives were to investigate the current prognosis of the disease and to establish treatment strategies upon diagnosis, with the goal of enhancing the quality of care for these patients.

Methodology

This descriptive case series study was conducted at Gastroenterology and hepatology department of Asian Institute of Medical Sciences, Hyderabad. The study was carried out during six months duration from March 2019 to September 2019. Patients of all age groups, both genders diagnosed with hepatocellular carcinoma based on ultrasonography and CT scan imaging as well as screening alpha fetoprotein levels, with evidence of portal vein tumor thrombosis (PVTT) detected through imaging modalities and patients with available medical records containing relevant clinical, laboratory, and imaging data were included. All the patients with evidence of other concomitant malignancies apart from HCC, cases with history of liver transplantation before the diagnosis of HCC with PVTT and those who were not agreeing to participate in the study were excluded. Patients were provided with detailed information about the study objectives, and written informed consent was obtained from each participant. They were assured that their information would be kept strictly confidential and used only for research purposes. To monitor the survival status of patients, a three-month follow-up period was initiated, facilitated through regular follow-up and phone contact. During each phone call, patients were interviewed in a compassionate manner, expressing concern for their well-being and asking about their current state of health.

Throughout this follow-up period, meticulous records were maintained, and all relevant data were diligently entered into a pre-existing form tailored specifically for this study's objectives. SPSS version 26 was used for data analysis. Chi-Square test was applied and P-value $\leq$0.05 was taken as significant

Results

Outlining the demographic characteristics of the study sample, consisting of 80 participants. The mean age of the patients was 56.4 years, with a standard deviation of 5.7 years. Average Body mass index (BMI) was 23.4 kg/m², with a standard deviation of 3.3 kg/m². In terms of gender distribution, the majority of participants were male 80.0%, while females were 20.0%. Table I

Table I: Descriptive statistics of demographic characteristics. (n=80)

Variables		Statistics	
Mean age		56.4±5.7 years	
BMI		23.4±3.3 kg/m^2	
Gender	Males	64	80.0%
	Females	16	20.0%
	Total	80	100.0%

Regarding the three-month survival rate, only 17.5% of the patients were found to have survived during and remaining patients did not survive, based on the outcomes recorded during follow-up assessments. This indicates a relatively low survival rate within the study cohort, as shown in figure 1.

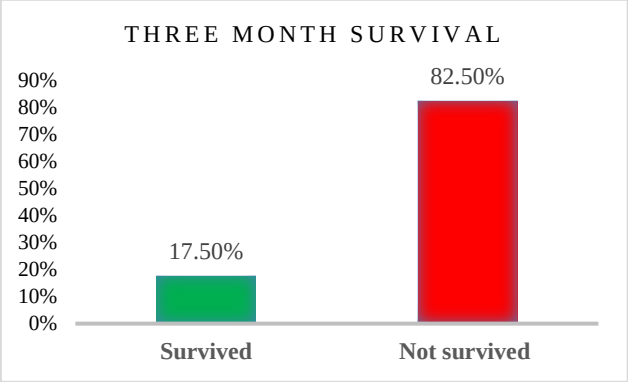

Figure 1. Frequency of three-month survival with HCC. (n=80)

Upon stratification, the analysis revealed that the three-month survival rate did not sho0w statistically significant differences across various demographic factors such as patients' age, gender, and BMI categories ($p \geq 0.05$), as shown in Table II.

Table II: Survival status according to age, gender and BMI. (n=80)

Variables		SURVIVAL STATUS		p-value
		SURVIVED	SURVIVED	
Age groups	18 – 40	6(7.5%)	45(56.3%)	0.073
	>40	8(10.0%)	21(26.3%)	
	Total	14(17.50%)	66(82.50%)	
Gender	MALE	9(11.3%)	42(52.5%)	0.963
	FEMALE	5(6.3%)	24(30.0%)	
	Total	14(17.50%)	66(82.50%)	
BMI	17 - 24	7(8.8%)	40(50.0%)	0.464
	> 24	7(8.8%)	26(32.5%)	
	Total	14(17.50%)	66(82.50%)	

Discussion

Hepatocellular carcinoma (HCC) is a primary liver malignancy characterized by aggressive tumor behavior and poor prognosis, particularly in advanced stages. Portal vein tumor thrombosis (PVTT) is a common complication of HCC and is associated with significantly reduced survival rates. However, this study has been done to evaluate the survival rate among hepatocellular carcinoma (HCC) patients presenting with portal vein tumor thrombosis (PVTT) over a 3-month followed up. This study consisting on overall 80 patients with mean age of 56.4 ±5.7 years, average Body mass index (BMI) was 23.4 kg/m² and male predominance 80.0%, while females were 20.0%. Consistently Siddiqui MT et al[12] reported that the average age of the patients HCC was 60 ± 11 years, and most of the participants were male 245(77%). In another study by Benevento F et al[13] reported that the mean age of the HCC patients was 57.6±11.4 years and they like this study they also found males in majority. Several factors may contribute to this observed male predominance in HCC incidence, like males have higher rates of engaging in behaviors associated with increased risk of contracting these infections, such as intravenous drug use and high-risk sexual behavior, alcohol consumption and smoking habits compared to women. Additionally, occupational exposures to hepatotoxic substances, such as certain chemicals and solvents, are more common among males.

This study indicates a relatively low survival rate within the study cohort, as only 17.5% of the patients were found to have survived during and remaining patients did not survive, based on the outcomes recorded during follow-up assessments. Furthermore, the analysis revealed that the three-month survival rate did not show statistically significant differences across various demographic factors such as patients' age, gender, and BMI categories ($p \geq 0.05$). Consistently et al[14] reported that the overall mortality rate was 76% among patients with HCC, while among 32 cases of HCC with HCC, 25 were died during the followed up of three months. In the line of this series Carr BI et al[15] indicated that individuals with portal vein thrombosis (PVT) who exhibited lower serum GGTP levels experienced notably extended survival compared to those with higher GGTP levels ($p = 0.0041$). On the other hand, Quirk M et al[16] demonstrated that the despite the development of numerous efficacious treatments that extend life for hepatocellular carcinoma (HCC) patients, managing those with portal vein thrombosis (PVT) remains particularly difficult, resulting in reduced survival rates. However, Xian J et al[17] conducted the study on cirrhotic patients without HCC and they reported that the existence of portal vein thrombosis (PVT) could potentially have a minor impact on the overall outlook for individuals with cirrhosis. Primarily, PVT appears to influence short-term prognoses by elevating the occurrence of hepatic decompensation events among cirrhosis patients. In aligns to this study Kurniawan A et al[18] found that patients with liver cirrhosis and hepatocellular carcinoma (HCC) who also had portal vein thrombosis (PVT) exhibited a markedly reduced estimated overall survival rate compared to those without PVT.

Specifically, the median estimated overall survival in the PVT group was 2.68 months, whereas it was 4.45 months in the non-PVT group.[18] According to a previous study by Takizawa D et al[19] observed that the prognosis among patients of HCC having PVTT observed to be quite poor. Furthermore, they reported that the patients with Child C did not have a higher rate of survival after treatment. Therefore, it is necessary to practice early detection, prevention, and the development of novel therapeutic

approaches.[19] Very limited recent studies have investigated the three-months survival among hepatocellular carcinoma (HCC) patients with portal vein thrombosis (PVT). This study identified a significant mortality rate, but its findings cannot be considered definitive due to several limitations. The most notable limitations include a very small sample size, a high rate of loss to follow-up among patients, lack of analysis regarding risk factors and duration of cirrhosis, and no examination based on treatment received and disease severity. However, conducting longitudinal studies that address these limitations is crucial to validate the findings. Such studies could provide valuable insights for developing treatment strategies aimed at improving the survival rates of these patients.

Conclusion

The study revealed poor survival rates among patients diagnosed with portal vein tumor thrombosis linked to hepatocellular carcinoma, with only 17.5% of patients surviving. The vast majority succumbed to this aggressive malignancy within the observed timeframe. However, the validity of these findings requires confirmation through additional research, ideally with larger sample sizes and a more comprehensive collection of variables. Collaborative studies involving multiple centers across Pakistan could validate the findings, thereby enabling better-informed clinical decision-making and ultimately leading to enhanced patient outcomes.

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