ปัจจัยทางคลินิกที่สัมพันธ์กับการเสียชีวิตภายใน 1 สัปดาห์และ 1 เดือน ในผู้ป่วยมะเร็งตับและทางเดินน้ำดีที่ได้รับการดูแลแบบประคับประคอง

Clinical Factor Associated with 1-week and 1-month Mortality in Palliative Hepatobiliary Cancer Patients

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บทคัดย่อ

ภูมิหลัง: มะเร็งตับและทางเดินน้ำดีเป็นโรคที่มีอัตราการเสียชีวิตสูง การระบุปัจจัยที่เกี่ยวข้องกับการเสียชีวิตในระยะ 1 สัปดาห์และ 1 เดือน มีความสำคัญต่อการวางแผนและตัดสินใจทางคลินิก

วัตถุประสงค์: เพื่อศึกษาปัจจัยคลินิกที่สัมพันธ์กับการเสียชีวิตภายใน 1 สัปดาห์และ 1 เดือนในผู้ป่วยมะเร็งตับและทางเดินน้ำดีที่ได้รับการดูแลประคับประคอง

วิธีการศึกษา: การศึกษาแบบย้อนหลัง ทบทวนเวชระเบียนผู้ป่วยที่ได้รับการดูแลจากศูนย์การุณรักษ์ โรงพยาบาลศรีนครินทร์ วันที่ 1 ตุลาคม 2564 ถึง 31 มกราคม 2567 เก็บข้อมูลด้านประชากร ลักษณะทางคลินิก คะแนน Palliative Performance Scale (PPS) และอาการสำคัญ วิเคราะห์ข้อมูลเชิงพรรณนา และใช้สถิติถดถอยโลจิสติกประเมินความสัมพันธ์ของปัจจัยต่างๆ กับการเสียชีวิตใน 1 สัปดาห์และ 1 เดือน กำหนดค่า $p< 0.05$ เป็นระดับนัยสำคัญ

ผลการศึกษา: จากผู้ป่วย 396 ราย 43.4% เสียชีวิตใน 1 สัปดาห์ และ 61.4% ใน 1 เดือน การวิเคราะห์แบบปรับตัวแปรร่วม พบว่า PPS 10–20, PPS 30 และอาการเหนื่อยล้า มีความสัมพันธ์กับการเสียชีวิตใน 1 สัปดาห์อย่างมีนัยสำคัญ (ORadj: 10.39, 95%CI: 1.25–86.71; ORadj: 3.09, 95%CI: 1.66–5.74; และ ORadj: 2.03, 95%CI: 1.30–3.20 ตามลำดับ) สำหรับการเสียชีวิตใน 1 เดือน พบว่า PPS 10–30 อาการเหนื่อยล้า และภาวะบกพร่องทางสติปัญญา มีความสัมพันธ์อย่างมีนัยสำคัญ (ORadj: 4.36, 95%CI: 2.03–9.38; ORadj: 2.42, 95%CI: 1.52–3.86; และ ORadj: 3.25, 95%CI: 1.18–8.94 ตามลำดับ) ผู้ป่วยทุกรายที่มีภาวะหายใจลำบากเสียชีวิตใน 1 เดือน

สรุป: คะแนน PPS ต่ำ อาการเหนื่อยล้า หายใจลำบาก และภาวะบกพร่องทางสติปัญญา เป็นปัจจัยสำคัญที่สัมพันธ์กับการเสียชีวิตระยะสั้น การรับรู้ปัจจัยเหล่านี้ช่วยให้ประเมินพยากรณ์โรค วางแผนการดูแล และเตรียมการดูแลได้เหมาะสมยิ่งขึ้น

คำสำคัญ: มะเร็งตับและทางเดินน้ำดี, การเสียชีวิตระยะสั้น, การดูแลแบบประคับประคอง

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ABSTRACT

Background: Hepatobiliary cancers have high mortality rates, and palliative care plays a crucial role in symptom management and quality-of-life support. Identifying factors associated with short-term mortality (1 -week and 1 -month) is essential for care planning and clinical decision-making.

Objectives: To examine clinical factors associated with 1-week and 1-month mortality among patients with hepatobiliary cancer receiving palliative care.

Methods: This retrospective cohort study reviewed medical records of patients receiving palliative care at the Karunruk Palliative Care Center, Srinagarind Hospital, from 1 October 2021 to 31 January 2024. Demographic data, clinical characteristics, Palliative Performance Scale (PPS) scores, and key symptoms were collected. Descriptive statistics and logistic regression analyses were performed to identify factors associated with short-term mortality, with statistical significance set at $p < 0.05$.

Results: Among 396 deceased patients, 43.4% died within 1 week and 61.4% within 1 month. After adjustment, PPS 10–20, PPS 30, and fatigue were significantly associated with 1-week mortality (adjusted OR: 10.39, 95% CI: 1.25–86.71; 3.09, 95% CI: 1.66–5.74; and 2.03, 95% CI: 1.30–3.20, respectively). For 1-month mortality, PPS 10–30, fatigue, and cognitive impairment remained significant factors (adjusted OR: 4.36, 95% CI: 2.03–9.38; 2.42, 95% CI: 1.52–3.86; and 3.25, 95% CI: 1.18–8.94, respectively). All patients presenting with dyspnea died within 1 month.

Conclusions: Low PPS scores, fatigue, cognitive impairment, and dyspnea are key factors associated with short-term mortality in hepatobiliary cancer. Recognition of these indicators can support prognostication, care planning, and preparation for end-of-life care.

Keywords: Hepatobiliary cancer, short-term mortality, Palliative care

Background and rationale

Hepatobiliary cancers, including hepatocellular carcinoma (HCC) and cholangiocarcinoma (CCA), are one of the most prevalent malignancies in Thailand and remain a major cause of cancer-related mortality worldwide. A study by Srivatanakul P[1]. identified these cancers, in 2001, as the leading cause of cancer-related deaths in men and the second leading cause in women in Thailand.

Despite advances in cancer management, the prognosis for hepatobiliary malignancies remains extremely poor. Patients diagnosed with HCC at BCLC stage D have a median survival of approximately 6 months[2], while those with advanced CCA have a median overall survival of less than 6 months[3] and approximately 4.5 months in metastatic biliary tract cancer[4]. Early consultation with palliative care plays a crucial role in symptom management and improving quality of life.

Survival prediction in patients with advanced cancer plays a crucial role in planning Advanced Care Planning (ACP). Beyond guiding treatment decisions and medical interventions, understanding prognosis is essential for aligning care with patient preferences. A study by Ahalt C. et al[5]., which interviewed older adults, revealed that 65% of participants wanted to discuss their prognosis if their doctor estimated they had less than five years to live, and 75% wanted this discussion if their estimated survival was less than one year. Key reasons why patients desire prognostic information, including the need to prepare, the ability to make the most of their remaining time, and the capacity to make informed medical and health-related decisions. A study by Wright AA et al[6].

A study by Yount S. et al[7]. identified pain, fatigue, nausea, weight loss, and jaundice as the most frequently reported symptoms among patients with advanced hepatobiliary cancer, significantly impacting their quality of life. Prognostic factors for HCC include performance status, Child-Pugh score, and BCLC stage[8], while for CCA, factors such as high CEA levels, lymph node metastasis, and positive surgical margins[9] correlate with survival outcomes. Common terminal-stage symptoms across cancer types include weakness, pain, and vomiting[10], with hepatobiliary cancer patients frequently presenting with progressive jaundice and metabolic complications[7].

Palliative care is defined as an approach that "improves the quality of life of patients (adults and children) and their families who are facing problems associated with life-threatening illness. It prevents and relieves suffering through the early identification, correct assessment and treatment of pain and other problems, whether physical, psychosocial or spiritual[11]" Patients with advanced, incurable hepatobiliary cancer should be referred to the palliative care team to ensure comprehensive, holistic support for both the patient and family. In most cases, referrals are initiated by the primary physician to facilitate appropriate palliative management.

To assess the functional status of terminal cancer patients, palliative care teams often employ the Palliative Performance Scale (PPS) as a standardized tool for communication, prognosis estimation, and care planning. Research indicates that PPS is more accurate in predicting survival for cancer patients compared to non-cancer patients[12], making it a valuable instrument in clinical practice. A PPS score of 100 indicates excellent performance status with full ambulation, whereas a score of 0 denotes death. Higher PPS scores reflect better

functional status and are associated with longer median survival. Previous studies have reported median survival times of 2, 6, and 13 days for patients with PPS scores of 10, 20, and 30, respectively. In contrast, patients with PPS scores of 40–60 and 70–80 have median survival times of approximately 39 and 95 days, respectively[12]. A study by Renteria et al. highlighted that a poor Eastern Cooperative Oncology Group performance status (ECOG-PS) significantly increases mortality risk in biliary tract cancer patients, suggesting that performance-based assessments are critical in determining disease trajectory[12].

Regarding symptoms associated with survival rates in terminal cancer patients, a study by Vigano A. et al. identified dyspnea and nausea/emesis as predictors of poor survival. Beyond symptoms, the presence of liver metastases was also found to be significantly associated with reduced survival[14]. Similarly, Gripp S. et al. identified several prognostic factors linked to poor outcomes, including brain metastases, Karnofsky Performance Status (KPS) below 50%, the use of strong analgesics, dyspnea, elevated lactate dehydrogenase (LDH), and leukocytosis[15].

Other symptoms reported to be associated with higher mortality rates include fatigue, as demonstrated by Liu Y et al.[16]; pain in cancer patients, as reported by Adam E. Singer et al[17].; and delirium, as shown in the study by Maxine de la Cruz et al[18].

In addition, a commonly used and validated tool for estimating survival in palliative care is the Palliative Prognostic Score (PaP score). According to the systematic review and meta-analysis by Yoong SQ et al[19]., the PaP score incorporates symptoms such as dyspnea and anorexia, together with the clinician's estimate of survival and selected laboratory parameters, to predict 30-day survival.

Most previous studies have investigated factors associated with mortality at 3 months and above. However, there is a lack of research focusing on patients in the terminal phase with a life expectancy of less than 1 month, which is commonly encountered in palliative care settings. As these patients are often frail and unsuitable for invasive diagnostic or prognostic procedures, this study aimed to identify clinical factors associated with short-term survival, 1-week and 1-month mortality. A deeper understanding of these may ultimately contribute to better clinical decision-making, timely ACP, and improve overall patient outcomes.

Objective

This study aimed to identify clinical factors associated with short-term survival, 1-week and 1-month mortality.

Methods

Study population

This retrospective cohort study was conducted at Karunruk Palliative Care Center (KPC), Srinagarind Hospital, Faculty of Medicine, Khon Kaen University, Thailand, which obtained ethical approval from the Institutional Review Board (IRB) of Khon Kaen University (HE671206). Data were obtained from hepatobiliary cancer patients who were referred for KPC between October 1, 2021, and January 31, 2024. The authors collected electronic medical records from KPC and Srinagarind Hospital.

Data collection

During the study period, baseline demographic and clinical data, including age, sex, marital status, education, health scheme, occupation, and comorbidity were collected at the initiation of palliative care consultation. Clinical symptoms were assessed at the same time with the Edmonton symptoms assessment scale (ESAS) including pain, dyspnea, fatigue, nausea, anxiety, depression, drowsiness, appetite, and well-being. Symptom severity was categorized into 3 groups: scores of 1–3 as mild, 4–6 as moderate, and 7–10 as severe symptoms. For analysis, each symptom was grouped into two levels-absent/mild and moderate/severe-according to the Palliative Care Outcomes Collaboration (PCOC) framework, in which moderate to severe symptoms are considered to require urgent clinical management[20]. Cognitive impairment and dysphagia were categorized into present and absent. Cognitive impairment was assessed by evaluating orientation to time, place, and person, along with the patient's ability to provide logical reasoning and accurate information. Patients who were unable to complete these components were classified as having cognitive impairment. For the primary outcomes of factors associated with death within 1 week and within 1 month, we collected all factors at the palliative care consultation date and death date to determine the patient's death time frames.

Statistical Analysis

Baseline characteristics and clinical symptoms were analyzed descriptively, with categorical variables presented as frequencies and percentages, and continuous variables expressed as means with standard deviations (SD). Clinical factors and subgroup analyses among hepatobiliary cancer patients presenting with dyspnea were conducted using logistic regression models for deaths occurring within one week and within one month. A zero-event issue was added 1 value into the contingency table to enable the calculation of the odds ratio. Associated factors were analyzed with a multiple logistic regression model in which we included (in a backward manner) all the significant variables from the univariate analysis, and those variables considered clinically relevant according to the current literature. A p-value of less than 0.05 was accepted as significant. All analyses were performed using STATA version 16.0 (StataCorp LLC, College Station, TX, USA).

Results

A total of 396 hepatobiliary cancer patients who received palliative care and subsequently died were included in the study. The mean age was 63.44 ± 11.14 years, with 67.4% male. Among those who died within 1 week (n = 175), the mean age was 63.13 ± 11.41 years, and 70.9% were male. Similarly, in the 1-month mortality group (n = 243), the mean age was 63.56 ± 11.17 years, with 68.7% male.

Regarding the health scheme, the majority of patients were covered under the universal coverage scheme 202 (51.0%), followed by the government officer scheme 171 (43.2%) and the Social Security scheme 10 (2.5%). Among those who died within 1 week, 83(48.5%) were covered by universal coverage, and 76 (44.4%) under the government officer scheme. The distribution was similar among 1-month mortality cases, with 129 (53.0%) and 97 (39.9%) under the universal coverage and government officer schemes, respectively.

By occupation, most patients 125 (31.6%) were retired/unemployed, followed by Agricultural workers 97 (24.5%), businesspeople, and government officers, respectively. Among those who died within 1 week, the majority 50 (29.1%) were retired/unemployed. Similarly, among patients who died within 1 month, most were also retired/unemployed 79 (32.5%), as shown in Table 1.

In terms of comorbidity, one-third of patients had at least one comorbidity. This proportion was nearly the same in both mortality groups, with 57 (33.1%) in the 1-week mortality group and 78 (32.1%) in the 1-month mortality group (Table 1).

Table 1 Baseline characteristics of palliative care patients with hepatobiliary cancer

Characteristics	Overall (n=396)	Death in 1 week (n=172)	Death in 1 month (n=243)
Sex			
Male	267 (67.4%)	122 (70.9%)	167 (68.7%)
Female	129 (32.7%)	50 (29.1%)	76 (31.3%)
Mean age	63.44±11.15	63.14±11.41	63.56±11.17
Marital status			
Single	25 (6.3%)	12 (7.0%)	16 (6.6%)
Married	307 (77.5%)	127 (73.8%)	182 (74.9%)
Divorced/Widowed	674 (16.2%)	33 (19.2%)	45 (18.5%)
Health scheme			
Universal coverage	202 (51.0%)	83 (48.5%)	129 (53.0%)
Government Officer	171 (43.2%)	76 (44.4%)	97 (39.9%)
Social security scheme	10 (2.5%)	5 (2.9%)	6 (2.5%)
Others	13 (3.3%)	7 (4.1%)	11 (4.6%)
Occupational			
Retried/ Unemployed	125 (31.6%)	50 (29.1%)	79 (32.5%)
Agriculture worker	97 (24.5%)	44 (25.6%	61 (25.1%)
Businesspeople	56 (10.1%)	26 (15.1%)	35 (14.4%)
Government officer	21(5.3%)	33 (19.2%)	46 (18.9%)
Others	34 (8.6%)	19 (11.0%)	22 (9.1%)
Comorbidity			
No	269 (67.9%)	115 (66.9%)	165 (67.9%)
Yes	127 (32.1%)	57 (33.1%)	78 (32.1%)

The most severe symptoms in both groups were pain and dyspnea. Pain was reported in 80.7% of patients who died within 1 week and 72.7% of those who died within 1 month. Dyspnea was reported 56.0% of patients who died within 1 week and 79.1% of those who died within 1 month.

Fatigue was also one of the commonly reported symptoms, reported in 50.6% of the 1-week group and 48.6% of the 1-month group. Additionally, a low PPS level was more common in patients who died within 1 week (39.5%) compared to those who died within 1 month (34.6%). Overall, most symptoms appeared more frequently and severely in the 1-week mortality group.

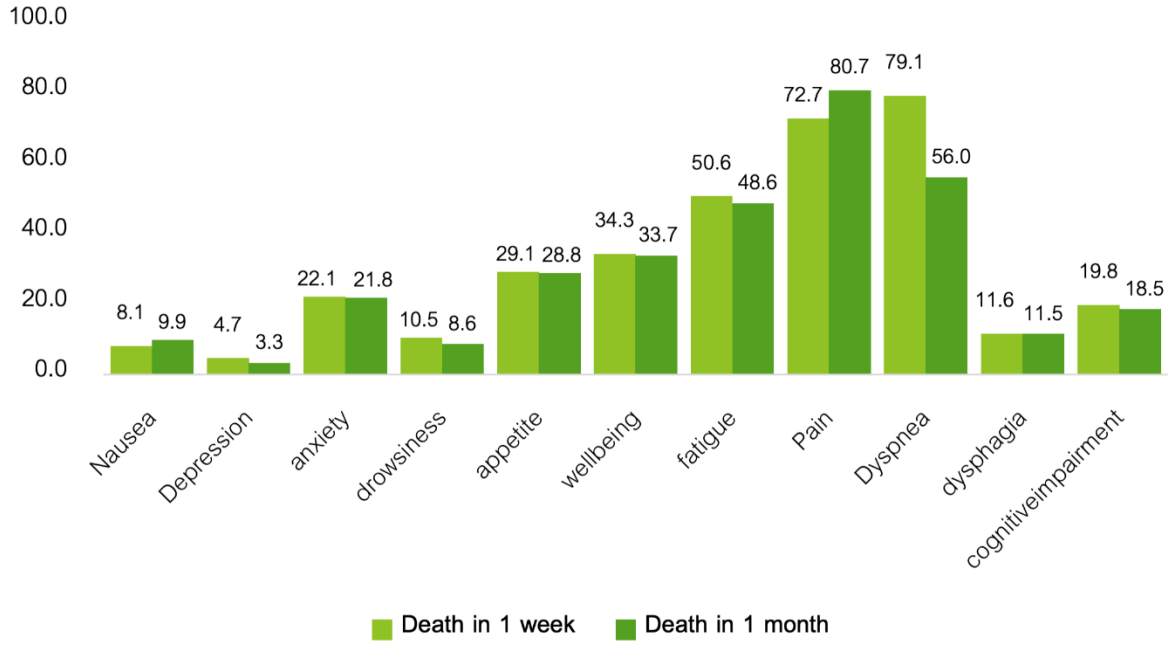

Figure 1 Proportion of moderate to severe symptom among patients who dead in 1 week and death in 1 month

The univariate logistic regression revealed that lower PPS scores were strongly associated with both 1-week and 1-month mortality. Compared with patients with a PPS of 40–100, those with a PPS of 30 had higher odds of death within 1 week (OR = 3.42, 95% CI: 2.00–5.84, $p < 0.001$) and 1 month (OR = 5.06, 95% CI: 2.56–10.00, $p < 0.001$). Patients with PPS 10–20 had the highest risk of mortality within both 1 week (OR = 19.88, 95% CI: 4.57–86.45, $p < 0.001$) and 1 month (OR = 19.78, 95% CI: 2.63–148.48, $p = 0.004$). Moderate to severe dyspnea was significantly associated with death within one week (OR = 975.48, 95% CI: 131.66–7,227.71, $p < 0.001$) and one month (OR = 202.50, 95% CI: 27.87–1471.21, $p < 0.001$). Moderate to severe fatigue was also significantly associated with 1-week (OR = 2.45, 95% CI: 1.59–3.76, $p < 0.001$) and 1-month mortality (OR = 2.86, 95% CI: 1.83–4.47, $p < 0.001$). Moderate to severe drowsiness predicted only 1-week mortality (OR = 2.18, 95% CI: 1.02–4.68, $p = 0.045$), whereas poor appetite was significantly associated with 1-month mortality (OR = 1.62, 95% CI: 1.01–2.62, $p = 0.047$), but not with 1-week mortality.

Symptoms including moderate to severe pain, poor well-being, anxiety, depression, and nausea were not significantly associated with mortality at either time point.

Table 2 Association between clinical factors and death in 1 week and 1 month using simple logistic regression analysis

Factors	Death in one week			Death in one months		
	Crude OR	95%CI	p-value	Crude OR	95%CI	p-value
PPS (n=394)						
40 -100	Ref.			Ref.		
30	3.42	2.00-5.84	<0.001*	5.06	2.56-10.00	<0.001*
10 - 20	19.88	4.57-86.45	<0.001*	19.78	2.63-148.48	0.004*
Nausea (n=368)						
Absent to mild	Ref.			Ref.		
Moderate to severe	0.97	0.47 – 1.99	0.934	1.69	0.78-3.65	0.181
Depression (n=354)						
Absent to mild	Ref.			Ref.		
Moderate to severe	1.88	0.63 – 5.54	0.251	0.91	0.31 – 2.68	0.866
Anxiety (n=353)						
Absent to mild	Ref.			Ref.		
Moderate to severe	1.40	0.85 – 2.32	0.187	1.57	0.92 – 2.65	0.096
Drowsiness (n=364)						
Absent to mild	Ref.			Ref.		
Moderate to severe	2.18	1.02 – 4.68	0.045*	1.66	0.74 – 3.74	0.219
Appetite (n=358)						
Absent to mild	Ref.			Ref.		
Moderate to severe	1.47	0.93 – 2.34	0.099	1.62	1.01 – 2.62	0.047*
Well-being (n=352)						
Absent to mild	Ref.			Ref.		
Moderate to severe	1.07	0.69 – 1.65	0.757	1.03	0.67 – 1.60	0.884
Fatigue (n=359)						
Absent to mild	Ref.			Ref.		
Moderate to severe	2.45	1.59 – 3.76	<0.001*	2.86	1.83 – 4.47	<0.001*
Pain (n=396)						
Absent to mild	Ref.			Ref.		
Moderate to severe	0.96	0.62 – 1.51	0.880	1.12	0.71 – 1.77	0.613

Factors	Death in one week			Death in one months		
	Crude OR	95%CI	p-value	Crude OR	95%CI	p-value
Dyspnea (n=391)						
Absent to mild	Ref.			Ref.		
Moderate to severe	975.48	131.66-7,227.71	<0.001*	202.50	27.87-1471.21	<0.001*
Dysphagia (n=379)						
No	Ref.			Ref.		
Yes	2.73	1.27 – 5.88	0.010*	6.99	2.09 – 23.42	0.002*
Delirium (n=384)						
No	Ref.			Ref.		
Yes	2.89	1.57 – 5.36	0.001*	4.15	1.89– 9.09	<0.001*
Cognitive impairment (n=378)						
No	Ref.			Ref.		
Yes	2.86	1.56 – 5.24	0.001*	4.48	2.04 – 9.79	<0.001*

Abbreviation: 95% CI, 95% confidence interval; Ref, Reference; *,Statistical significant p-value<0.05

In the multivariate analysis, patients with lower PPS scores had significantly higher odds of early mortality. Those with a PPS of 30 were more likely to die within 1 week (adjusted OR = 3.09; 95% CI: 1.66–5.74; p < 0.001), and the risk was higher among patients with PPS 10–20 (adjusted OR = 10.39; 95% CI: 1.25–86.71; p = 0.031). Moderate to severe fatigue was also associated with 1-week mortality (adjusted OR = 2.03; 95% CI: 1.30–3.20; p = 0.002), whereas cognitive impairment showed a nonsignificant associated (adjusted OR = 1.52; 95% CI: 0.72–3.20; p = 0.271). For 1-month mortality, PPS scores of 10–30 were associated with death (adjusted OR = 4.36; 95% CI: 2.03–9.38; p < 0.001). Moderate to severe fatigue (adjusted OR = 2.42; 95% CI: 1.52–3.86; p < 0.001) and cognitive impairment (adjusted OR = 3.25; 95% CI: 1.18–8.94; p = 0.022) also remained significant predictors in the multivariate model.

Table 3 Association between clinical factors and death in 1 week using multiple logistic regression analysis (n=357)

Factors	Adjusted OR	95% CI	p-value
PPS level			
40-100	Ref.		
30	3.09	1.66-5.74	<0.001*
10-20	10.39	1.25-86.71	0.031*
Fatigue			
Mild	Ref.		
Moderate to severe	2.03	1.30-3.20	0.002*
Cognitive impairment			
Mild	Ref.		
Moderate to severe	1.52	0.72 - 3.20	0.271

Abbreviation: 95% CI, 95% confidence interval; Ref, Reference; *,Statistical significant p-value<0.05

Table 4 Association between clinical factors and death in 1 month using multiple logistic regression analysis (n=357)

Factors	Adjusted OR	95% CI	p-value
PPS level			
40-100	Ref.		
10-30	4.36	2.03 - 9.38	<0.001*
Fatigue			
Mild	Ref.		
Moderate to severe	2.42	1.52-3.86	<0.001*
Cognitive impairment			
Mild	Ref.		
Moderate to severe	3.25	1.18-8.94	0.022*

Abbreviation: 95% CI, 95% confidence interval; Ref, Reference; *,Statistical significant p-value<0.05

Because most hepatobiliary patients presented with dyspnea, A subgroup analysis was conducted to identify independent predictors of mortality among hepatobiliary cancer patients presenting with dyspnea (Table 5).

In the multivariate model, patients with lower PPS (10–30) had significantly higher odds of death within one week (Adjusted OR = 3.73, 95% CI: 1.94–7.18, $p < 0.001$) and within one month (Adjusted OR = 4.47, 95% CI: 1.98–10.11, $p < 0.001$). Moderate to severe fatigue was also significantly associated with death within one week (Adjusted OR = 2.26, 95% CI: 1.42–3.60, $p < 0.001$) and within one month (Adjusted OR = 2.50, 95% CI:

1.54–4.05, p < 0.001). Dysphagia and cognitive impairment were not associated with mortality in both time frames.

Table 5 Association between clinical factors and death in 1 week among palliative care patients with dyspneic hepatobiliary cancer using multiple logistic regression analysis (n=338)

Factors	Death in one week			Death in one months		
	Adjusted OR	95% CI	p-value	Adjusted OR	95% CI	p-value
PPS level						
40-100	Ref.			Ref.		
10-30	3.73	1.94-7.18	<0.001*	4.47	1.98-10.11	<0.001*
Fatigue						
Mild	Ref.			Ref.		
Moderate to severe	2.26	1.42-3.60	<0.001*	2.50	1.54-4.05	<0.001*
Dysphagia						
No	Ref.			Ref.		
Yes	0.60	0.19-1.87	0.380	1.38	0.33-5.83	0.664
Delirium						
No	Ref.			Ref.		
Yes	2.23	0.63-7.95	0.214	1.23	0.24-6.18	0.805
Cognitive impairment						
Mild	Ref.			Ref.		
Moderate to severe	0.90	0.28-2.94	0.863	2.19	0.45-10.60	0.332

Abbreviation: 95% CI, 95% confidence interval; Ref, Reference; *,Statistical significant p-value<0.05

Discussions

This study investigated factors associated with 1-week and 1-month mortality in palliative hepatobiliary cancer patients. From the Univariate analysis, we found PPS10-30, fatigue, poor appetite, dyspnea, dysphagia, and cognitive impairment were significantly associated with mortality. For multivariate analysis, we found PPS 10-30, fatigue and cognitive impairment were significantly associated with mortality. Additionally, for moderate to severe dyspnea patients, low PPS and fatigue were significantly associated with 1-week and 1-month mortality.

PPS are consistent with those of Bischoff KE et al[21]., who reported that lower PPS scores were associated with shorter survival. Similar results were also observed in the study by Patcharaporn et al[12]. The progressive decline observed in patients near the end of life is consistent with typical cancer illness trajectories, driven by factors such as tumor burden, cachexia, and multi-organ failure. This may explain why patients with

lower PPS are more likely to be approaching death. Fatigue is a commonly observed symptom in palliative care patients, including our study. Our findings demonstrated that fatigue was significantly associated with both 1-week and 1-month mortality, which is consistent with the study by Liu Y et al[16]. In the palliative care setting, fatigue is a complex, multidimensional symptom that frequently arises from a confluence of physical, biological, psychological, and treatment-related factors. Dysphagia was associated with both 1-week and 1-month mortality; however, this association was not significant after multiple logistic regression. In the study by Schelomo Marmor et al[22]. conducted in lung cancer patients, dysphagia was associated with reduced survival. This may be explained by progressive physical decline due to tumor burden and infection, which can exacerbate swallowing difficulties.

In this study, cognitive impairment in hepatobiliary cancer patients was assessed using a clinical assessment by evaluating orientation to time, place, and person, along with the patient's ability to provide logical reasoning and accurate information. The investigators considered that most cognitive impairment was likely related to hepatic encephalopathy. Previous studies have shown that patients with severe liver disease develop hepatic encephalopathy [23-25]. In hepatobiliary cancers, hepatic encephalopathy may arise from several mechanisms, including tumor-related portal hypertension, malignant biliary obstruction, and tumor infiltration or necrosis of liver parenchyma. The resulting encephalopathy can contribute to significant cognitive impairment. In study, most deaths among patients with hepatic encephalopathy were attributed to decompensated chronic liver disease and sepsis[26]. In addition, the study found that patients with cognitive impairment were also at increased risk of death from cardiovascular conditions. This association is presumed to be related to underlying factors such as atherosclerosis, hypertension, and diabetes, which contribute to neuronal injury. Another possible explanation is that patients with cognitive impairment often experience difficulties with self-care and treatment adherence, further increasing their vulnerability[27]. Cognitive impairment was associated with both 1-week and 1-month mortality in univariate logistic regression, and it remained significantly associated with 1-month mortality in the multivariate analysis.

Dyspnea is a common symptom among patients with advanced cancer, as reported by Shin J et al[28]., particularly during the final stages of life. Frostad A et al. found that dyspnea was associated with higher mortality rates[29], consistent with the findings of Seow H et al., who observed that the prevalence of dyspnea increased as death approached, especially within the last month of life[30]. In this study, most patients experienced dyspnea, and the presence of dyspnea was significantly associated with both 1-week and 1-month mortality. Among patients who died within one week, the odds of experiencing moderate to severe dyspnea were five times higher than among those who died within one month. This finding is consistent with previous studies demonstrating that the prevalence and severity of dyspnea increase markedly during the final month of life and intensify further in the days immediately preceding death[31]. In patients with cancer, dyspnea has also been identified as a prognostic indicator associated with a median survival of fewer than 30 days[32]. Moreover,

patients presenting with dyspnea in combination with low PPS or moderate to severe fatigue demonstrated higher 1-week and 1-month mortality rates as well.

Moderate to severe pain was not associated with both 1-week and 1-month mortality. According to the study by Adam E. Singer[17], pain was highly prevalent among cancer patients during the last year of life and showed an increasing trend, although this did not reach statistical significance.

This study has several limitations. First, the retrospective design limited comprehensive data collection. Important laboratory variables and potential confounding factors such as bilirubin, creatinine, white blood cell count, sepsis, and concurrent infections was not consistently documented and included in this study. Second, the retrospective nature of the study resulted in missing data, with an overall missing data rate of 6.46%. The proportion of missing data varied across variables, with well-being having the highest rate at 11.1%, while pain and dyspnea had complete data (0% missing). Our dataset contained missing data for several factors, and due to the planned analytical approach using simple and multiple logistic regression models, missing data were handled using complete case analysis (listwise deletion). This approach may have reduced statistical power. Third, for patients who were dying or had impaired cognition, ESAS data were occasionally obtained from family members or healthcare providers rather than directly from the patients themselves, which may have introduced proxy-reporting bias. Forth, cognitive impairment was assessed by the evaluator rather than using a standardized cognitive assessment tool, which may limit the reliability and reproducibility of the data.

For further studies, laboratory factors should be included in the study of in-hospital hepatobiliary cancer patients. The further predictive survival model may be useful for healthcare providers to evaluate and create an individual care plan.

Conclusions

This study demonstrates clinical factors associated with 1-week and 1-month mortality among patients with hepatobiliary cancer including lower PPS, moderate to severe fatigue, and dyspnea. Early identification of prognostic factors such as low PPS, fatigue, dysphagia, and cognitive impairment is essential for guiding timely and appropriate palliative interventions. Routine assessment of these symptoms during initial consultation can help healthcare providers anticipate short-term mortality and plan individualized care plan. Patients presenting with low PPS, moderate to severe dyspnea and fatigue should be prioritized for advanced care planning to ensure that their treatment preferences and comfort measures are respected.

Recommendations

Early identification of prognostic factors such as low Palliative Performance Scale (PPS), moderate to severe dyspnea and fatigue is essential for guiding timely and appropriate palliative interventions. Routine assessment of these symptoms during initial consultation can help healthcare providers anticipate short-term mortality and plan individualized care plans. Patients presenting with low PPS, moderate to severe dyspnea

and fatigue should be prioritized for advanced care planning to ensure that their treatment preferences and comfort measures are respected.

Body of Knowledge

This study provides new evidence on short-term prognostic factors among hepatobiliary cancer patients receiving palliative care. Low Palliative Performance Scale (PPS), moderate to severe dyspnea and fatigue were identified as key indicators of mortality within one week and one month after consultation. These findings emphasize the clinical value of routine PPS assessment and comprehensive symptom evaluation as practical tools for early risk stratification. Integrating these indicators into palliative care practice can support proactive care planning, optimize resource use, and improve quality of life for patients and their families.

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