

Review

Evidence-based nursing care in patients with liver abscess – mini review

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ABSTRACT

Pyogenic liver abscess (PLA) is a life-threatening infection associated with a high risk of sepsis, organ failure, and mortality, requiring prompt diagnosis and effective source control. As no disease-specific nursing protocols for PLA currently exist, nursing care is largely based on recommendations for sepsis, intra-abdominal infections, and perioperative management. Evidence-based nursing (EBN) supports early recognition of clinical deterioration and monitoring of treatment response. A narrative literature review was conducted using publications from 2010 to 2025 retrieved from PubMed, Scopus, and Web of Science, together with selected nursing and hepatology journals. Of 187 identified records, 72 articles underwent full-text assessment and 51 met the predefined inclusion criteria. The review included original studies, reviews, clinical guidelines, and case reports addressing PLA, sepsis, drainage techniques, and EBN. Because of the limited evidence on nursing interventions specific to PLA, relevant data from abdominal surgery, hepatology, and intensive care were also incorporated. Available evidence indicates that systematic nursing assessment, use of early warning scores, timely escalation of care, and appropriate management of percutaneous and surgical drainage may improve patient safety and clinical outcomes in PLA. Nursing care based on EBN principles, supported by early warning systems and structured clinical communication, may improve the management of patients with PLA. However, most recommendations rely on indirect evidence from sepsis, intensive care, and perioperative practice, highlighting the need for prospective studies to develop and validate disease-specific nursing protocols.

KEYWORDS

pyogenic liver abscess, PLA, evidence-based nursing, EBN, sepsis, nursing care

Introduction

Pyogenic liver abscess (PLA), although relatively uncommon, is associated with a substantial risk of severe clinical deterioration, sepsis, and death. This clinical profile highlights the importance of systematic nursing care informed by evidence-based nursing (EBN) principles. Nursing management requires the integration of general measures used in severe infection with interventions specific to hepatic disease and interventional procedures. Core responsibilities include repeated assessment of the patient's overall condition, monitoring of vital signs and laboratory parameters, appropriate care of abscess drainage systems, wound observation, and evaluation of the response to causal treatment. Particular attention should be paid to the early recognition of liver dysfunction, coagulopathy, progression of sepsis, and emerging organ failure [1].

Compared with general nursing care in sepsis, PLA management requires particularly close coordination of nursing observations with the timely interpretation of microbiological cultures obtained from abscess contents. This process supports the identification of multidrug-resistant pathogens and the appropriate modification of antimicrobial therapy, both of which may substantially influence prognosis [2].

The modern practice of EBN in the care of patients with severe infections is based on the use of standardized screening tools such as the National Early Warning Score 2 (NEWS2) and the quick Sequential Organ Failure Assessment (qSOFA) in order to assess the clinical condition as early as possible and, in the event of deterioration of the patient's condition, to initiate rapid therapeutic interventions. It has been shown that standardizing interdisciplinary communication through tools such as SBAR (Situation, Background, Assessment, and Recommendation) significantly increases the effectiveness of clinical management [3]. Epidemiologically, PLA remains rare, however, its incidence continues to show an upward trend, with publications indicating an increasing proportion of cases with hypervirulent strains of *Klebsiella pneumoniae* (*K. pneumoniae*) or multidrug-resistant microbes, which usually complicates treatment and prognosis [4]. Modern treatment of PLA is based on a combination of targeted antibiotic therapy with percutaneous drainage under ultrasound or CT guidance (the method of first choice in most patients), and nursing care includes three stages: monitoring of clinical status, perioperative care and patient education [5]. In care procedures, EBN is a model for the conscious and systematic use of reliable, accessible scientific evidence, integrated with clinical experience and patient preferences, in order to optimize nursing decisions. In the field of liver abscess care, studies dedicated exclusively to nursing interventions remain scarce; therefore, clinical practice relies on extrapolation of evidence from research on sepsis, abscess drainage, and the care of patients with severe liver disease.

The aim of this review was to provide a concise, clinically oriented synthesis of the principal elements of nursing care for patients with liver abscess, interpreted in the context of currently available EBN evidence.

Material and methods

This review was designed as a narrative synthesis. Literature searches were conducted in PubMed, Scopus, and Web of Science, as well as in selected nursing and hepatology journals, and covered publications from 2010 to 2025. The search strategy used combinations of the terms “liver abscess,” “pyogenic liver abscess,” “nursing,” “percutaneous drainage,” “sepsis,” and “Evidence-Based Nursing” (EBN). The search identified 187 records. Titles and abstracts were screened for

relevance to the review objective, after which 72 publications were selected for full-text assessment. Following application of the eligibility criteria described below, 51 publications were included in the final narrative synthesis. These comprised original studies, review articles, case reports, clinical guidelines, and recommendations relating to liver abscesses, nursing care in sepsis, management of drainage systems, and EBN.

Publications were eligible if they were written in English or Polish and addressed at least one of the following areas: the epidemiology, diagnosis, treatment, or prognosis of PLA; percutaneous or surgical drainage of liver abscesses; nursing care in sepsis, emergency care, liver disease, or interventional procedures; or the application of EBN to the care of seriously ill surgical patients. Studies were considered relevant when the described interventions or clinical observations had a plausible practical application to patients with PLA, including sepsis surveillance, drain management, assessment of treatment response, prevention of complications, or patient education.

Studies were excluded when they focused on abscesses of atypical etiology without a documented relevance to nursing practice, particularly endemic or parasitic infections without features of a generalized inflammatory response. Pediatric publications were excluded unless they addressed broadly applicable principles of EBN. The review also excluded duplicate reports, conference abstracts, commentaries of limited substantive value, publications without full-text access, and papers that did not describe clinically relevant interventions or outcomes. The final selection was therefore based on thematic relevance, clinical applicability, and sufficient methodological and reporting detail for narrative synthesis.

Because direct studies of nursing interventions specifically in PLA remain scarce, the synthesis necessarily integrated evidence from hepatology, intensive care, abdominal surgery, interventional treatment, and EBN. This approach broadened the clinical context but also introduced an important limitation: not all findings derived from these related populations can be assumed to apply directly to patients with PLA.

Epidemiology, early diagnosis, and the role of the nurse in the care of a patient with a liver abscess

Population analyses and retrospective case series confirm that liver abscesses are a serious condition with significant morbidity and mortality, especially in high-risk groups such as people with diabetes, liver disease or immunosuppression. Liver abscesses caused by *K. pneumoniae* often have a severe course and may lead to sepsis and, consequently, to serious systemic complications. Lack or misdiagnosis and delay in causal treatment significantly worsen the prognosis and increase the risk of septic complications. Diabetes and hyperglycemia are often

predictors of positive blood cultures and severe sepsis in the course of PLA, which emphasizes the importance of their early identification in clinical and nursing practice [6]. Nurses play a central role in the early recognition and management of sepsis, contributing to improved clinical outcomes in patients with severe infections, including those with liver abscesses.

Analysis of the available studies indicates that early use of standardized screening tools, sepsis protocols, and effective interdisciplinary communication by nurses significantly shortens the time to sepsis recognition and initiation of treatment. High nursing competencies and practice consistent with EBN are associated with lower mortality, shorter hospital stays, and improved quality of care for patients with infection [7]. A particularly severe clinical course is observed in cases of liver abscesses caused by hypervirulent strains of *K. pneumoniae* (hvKp), which are characterized by an increased ability to invade, spread rapidly, and the occurrence of distant complications – e.g., brain abscesses. Limited penetration of antibiotics into the focus of infection and high virulence of the pathogen pose particular challenges for the therapeutic team, including the nursing team, in terms of intensive monitoring, treatment and prevention of complications [8].

Early warning tools and nursing protocols in the prevention of sepsis

Studies show that nurse-managed care protocols based on standardized screening tools and clearly defined escalation procedures enable faster recognition of sepsis and earlier initiation of treatment [9]. This approach improves the response of the healthcare team and enhances patient safety. The recommendations emphasize that rapid culture collection, determination of procalcitonin concentrations and incorporation of broad-spectrum antibiotic therapy in the first hours are critical elements of management, with a significant reduction in severe complications [10]. In clinical practice, the implementation of the management regimen also requires the routine use of early warning tools, such as the NEWS2 and the qSOFA, usually included in the medical records, used to systematically assess the risk of deterioration of the patient's condition [11]. NEWS2 has been shown to be a reliable system of medical management, enabling early identification of patients at risk of sudden deterioration and limiting delays in the implementation of radical treatment [12]. A complement to clinical assessment tools is the use of structured communication models, such as the SBAR protocol, as mentioned above, which improve the quality of information transfer and support the safety of patients requiring urgent and comprehensive care [13].

The effectiveness of NEWS2 and qSOFA and the importance of SBAR communication in nursing practice

Routine use of NEWS2 and qSOFA may facilitate the early identification of patients at risk of clinical deterioration, whereas the SBAR protocol supports clearer and safer communication in urgent clinical situations.

The NEWS2 has demonstrated prognostic value in populations at risk of acute deterioration. An area under the curve (AUC) of 0.86 in receiver operating characteristic (ROC) analysis indicates good discriminatory performance. Because the ROC curve expresses the ability of a tool to distinguish between different clinical outcomes, and AUC values range from 0.5 (no discrimination) to 1.0 (perfect discrimination), a value of 0.86 supports the usefulness of NEWS2 as an early warning instrument. However, because the cited evidence was not generated specifically in patients with PLA, its direct applicability to this population should be interpreted cautiously [14].

In patients with liver abscess, clinically important hemodynamic changes may develop over a short period. A NEWS2 score above 5 should therefore be treated as an alarm signal requiring prompt clinical reassessment and escalation in accordance with local protocols [15]. qSOFA is a simple bedside tool based on respiratory rate ≥ 22 /min, systolic blood pressure ≤ 100 mmHg, and altered mental status. A positive qSOFA result has been associated with an increased risk of in-hospital death [16]. Nevertheless, meta-analytic evidence indicates that, despite its high specificity, qSOFA has limited sensitivity for detecting severe sepsis and should not be used as a stand-alone screening tool [17]. In nursing practice, qSOFA may therefore serve as an adjunctive indicator of deterioration rather than a substitute for comprehensive assessment and repeated monitoring.

On the other hand, studies on the use of SBAR have shown that the correct application of this protocol improves the completeness and precision of the information provided, reduces communication errors and shortens the response time of the therapeutic team in situations of sudden deterioration of the patient's condition [18].

The combined use of NEWS2, qSOFA, and structured SBAR communication illustrates how EBN principles can be translated into everyday nursing practice. Available analyses suggest that NEWS2 may outperform qSOFA in predicting organ failure and clinical deterioration, supporting its preferential use as the primary early warning system, while qSOFA remains a complementary assessment tool [19].

Nursing care for percutaneous and surgical drainage – evidence-based practice

According to current guidelines and clinical recommendations, the standard of treatment for most liver abscesses is percutaneous drainage (needle aspiration or catheter drainage) performed under the guidance of ultrasound or computed tomography, in combination with systemic antibiotic therapy [20]. Surgical treatment with opening of the abdominal cavity is indicated in critical conditions, with the lack of possibility of percutaneous drainage, the presence of complications and the ineffectiveness of minimally invasive methods [21].

The effectiveness and safety of drainage depend not only on procedural technique but also on appropriate patient preparation, intraprocedural observation, and systematic post-procedural drain care. In the pre-procedural phase, nursing assessment should include verification of relevant laboratory results, particularly coagulation parameters, blood count, and inflammatory markers, to support the identification of bleeding and infection risk. During and after drainage, close monitoring enables early recognition of abnormalities and timely escalation. This approach, together with team-based pain management and standardized care procedures, may reduce complications and improve the quality of perioperative and postoperative care [22,23]. Post-procedural nursing care includes assessment of the puncture site, monitoring of the volume and character of drainage, and maintenance of catheter patency. Sudden reduction in drainage, new or increasing pain, fever, or the presence of blood or bile should prompt immediate clinical reassessment [24]. Reports from clinical practice indicate that drain care remains a significant nursing challenge, supporting the need for clear, evidence-informed procedures in surgical units [25].

New directions in evidence-based nursing in the care of patients with a liver abscess

Contemporary EBN-oriented care for patients with liver abscess increasingly emphasizes rapid collection of microbiological specimens and timely initiation of antimicrobial therapy, particularly in view of the increasing prevalence of hypervirulent and multidrug-resistant strains of *K. pneumoniae*. Current clinical analyses indicate that hvKp infections may follow a more aggressive course, show a greater tendency to disseminate, and be associated with poorer outcomes, thereby increasing the need for early nursing surveillance and close interdisciplinary cooperation [26]. Vascular complications, particularly portal vein thrombosis (PVT), have also gained clinical importance and may be associated with impaired liver function and increased mortality in patients with severe PLA. These findings support careful monitoring of hemodynamic and laboratory parameters and heightened clinical vigilance [27]. Early recognition of an inadequate response to conservative treatment may also contribute to timely consideration of catheter drainage in patients with complex abscesses [28]. Comprehensive nursing care should additionally address

pain, nutritional support, prevention of complications, liver function monitoring, and antimicrobial safety [29]. Based on the evidence synthesized in this review, the authors developed an integrated EBN care pathway for patients with PLA, covering the sequence from early clinical assessment to evaluation of care quality. The pathway is an author-derived proposal intended to organize available evidence and support clinical reasoning; it has not yet been prospectively tested or clinically validated. It should therefore be regarded as a conceptual framework rather than a formally validated clinical algorithm (Figure 1).

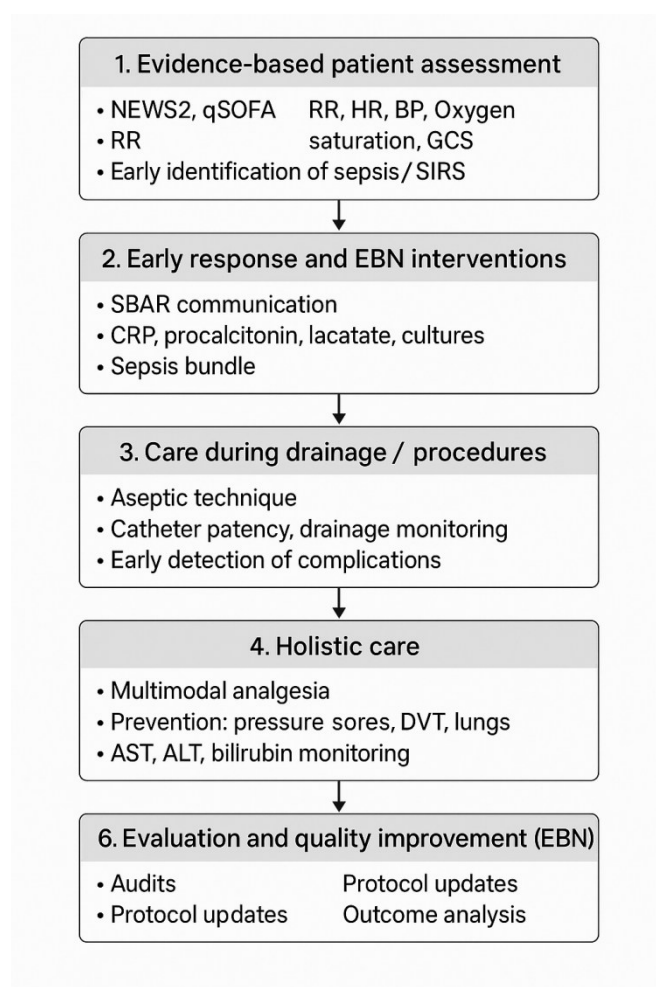


Fig. 1. Author-proposed evidence-based nursing (EBN) care pathway for patients with pyogenic liver abscess. The pathway was developed from the evidence synthesized in this review and has not yet undergone prospective clinical validation. NEWS2 – National Early Warning Score 2; qSOFA – quick Sequential Organ Failure Assessment; RR – respiratory rate; HR – heart rate; BP – blood pressure; GCS – Glasgow Coma Scale; SIRS – systemic inflammatory response syndrome; SBAR – Situation, Background, Assessment, and Recommendation; CRP – C-reactive protein; DVT – deep vein thrombosis; AST – aspartate aminotransferase; ALT – alanine aminotransferase

Discussion

Liver abscess remains associated with a substantial risk of sepsis and death despite advances in diagnostic imaging, antimicrobial therapy, and drainage techniques. Available evidence indicates that outcomes are strongly influenced by the timely recognition of deterioration and effective

control of the infectious focus [30]. Within this context, the proposed nursing care pathway organizes assessment, escalation, procedural care, and outcome evaluation. Its potential value lies in structuring clinical practice; however, because it has not been clinically validated, it should not be interpreted as a substitute for local protocols, multidisciplinary judgment, or disease-specific guidelines (Figure 1).

The principal limitation of the available evidence is the scarcity of studies designed specifically to evaluate nursing interventions in patients with PLA. Consequently, several recommendations discussed in this review are extrapolated from sepsis, intensive care, perioperative care, interventional radiology, and chronic liver disease. Although these sources provide a clinically coherent basis for nursing practice, their findings cannot be transferred to PLA without reservation because the patient populations, disease mechanisms, procedures, and outcome measures differ. Statements regarding improved safety or clinical outcomes should therefore be understood as evidence-informed expectations rather than effects conclusively demonstrated in PLA-specific prospective studies. Early warning tools such as NEWS2 may support recognition of deterioration, but their performance and optimal escalation thresholds require validation in this particular patient group [31].

The increasing clinical relevance of hypervirulent and multidrug-resistant *K. pneumoniae* further reinforces the need for close surveillance and timely microbiological sampling. When cultures cannot be obtained before treatment, empirical antibiotic therapy may be necessary, with specimen collection deferred until an interventional or surgical procedure becomes possible [32]. Vascular complications, including PVT, also warrant attention. Data from the POLAIR study identify PVT as an independent risk factor for death among critically ill patients with PLA, supporting regular hemodynamic, laboratory, and neurological assessment [27,33]. In interventional management, percutaneous drainage remains the preferred approach in many patients, but its success depends not only on technical performance but also on the quality of peri-procedural monitoring and subsequent drain care.

Nurses have a central role in maintaining drain patency, documenting the amount and characteristics of drainage, observing the insertion site, and recognizing bleeding, bile leakage, infection, or treatment failure at an early stage. Evidence from related procedural settings suggests that standardized nursing protocols may reduce complications and improve safety [34]; however, this effect has not been established specifically for PLA. The continuous presence of nursing staff also supports coordination of multidisciplinary recommendations, identification of subtle clinical changes, patient comfort, nutritional support, medication safety, and monitoring of neurological status, fluid and electrolyte balance, and liver function [35]. Future research should

prioritize prospective, multicenter studies evaluating clearly defined nursing interventions in patients with PLA. Relevant outcomes should include time to recognition of deterioration, time to escalation of care, drainage-related complications, sepsis progression, length of hospitalization, readmission, mortality, patient-reported outcomes, and adherence to structured care pathways. The proposed pathway should also undergo feasibility testing, external expert evaluation, and prospective clinical validation before routine implementation. Until such evidence becomes available, EBN offers a rational framework for integrating the best available evidence with clinical expertise, patient needs, and systematic evaluation of care outcomes.

Conclusions

PLA is a clinically important infectious focus within the hepatic parenchyma that may progress to sepsis and organ failure. Prognosis depends on timely diagnosis, effective source control, and early recognition of clinical deterioration. Continuous and structured nursing assessment, supported by tools such as NEWS2, qSOFA, and SBAR, may strengthen surveillance, communication, and escalation of care. Nevertheless, direct evidence evaluating nursing interventions specifically in patients with PLA remains limited. The care pathway proposed in this review should therefore be considered an evidence-informed, author-developed framework that requires prospective clinical validation before it can be recommended as a standardized disease-specific protocol.

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Informed consent statement

Not applicable.

Conflict of interest

The authors declare no conflict of interest.

Authors' contribution

Study design – B. Pietrzyk, W. Pierzchała, S. Krybus, M. Wieczorek

Data collection – W. Pierzchała, M. Wieczorek, S. Krybus, B. Pietrzyk

Manuscript preparation – B. Pietrzyk, W. Pierzchała

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