Comparative Outcomes of Indwelling Peritoneal Catheters (IPCs) versus Large Volume Paracentesis (LVP) in the Management of Malignant and Non-Malignant Ascites: A Systematic Literature Review

Ning-Ling Huang, MS[1], Monica Telinoiu, MBA, MS[2], Shanee Armstrong, MBA[3], Mutsuo Yamazaki, PhD[4], Takeshi Tomaru, BS[4], Hiroshi Kubo, MD, PhD[4].
[1]Becton, Dickinson and Company, Singapore, Singapore, [2]Becton, Dickinson and Company, Franklin Lakes, NJ, USA, [3]Becton, Dickinson and Company, Tempe, AZ, USA, [4]Nippon Becton Dickinson Company, Tokyo, Japan.

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Introduction

Ascites is a common and debilitating complication of advanced cancers and end-stage liver disease, often resulting in significant symptom burden and reduced quality of life (QoL) for patients and caregivers. Large volume paracentesis (LVP) is frequently used for the management of malignant ascites (MA) and non-malignant ascites (NMA). LVP provides short-term relief and is associated with complications such as circulatory dysfunction and the need for repeated hospital visits. Indwelling peritoneal catheters (IPCs) are increasingly recognized as an alternative for patients requiring frequent fluid removal. IPCs offer a home-based, long-term drainage solution that is expected to provide effective symptom relief, improve patient QoL, and reduce hospital visits.[1,2]

To evaluate the potential advantages of IPCs over LVP in ascites management, a systematic literature review (SLR) was conducted, focusing on clinical outcomes and healthcare resource utilization.

Methods

Studies were searched in PubMed and grey literature from 1997 to January 2025, as IPCs were first introduced to the market in 1997. PICOS strategy is presented in Table 1. Eligible studies included patients with MA and NMA treated with IPCs and implantable ports, with or without comparison to LVP. Both comparative and single-arm studies of any duration and sample size were included. Abstracts and letters to the editor were excluded. The review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The Joanna Briggs Institute (JBI) Critical Appraisal Tools were used to assess the quality of the included studies.

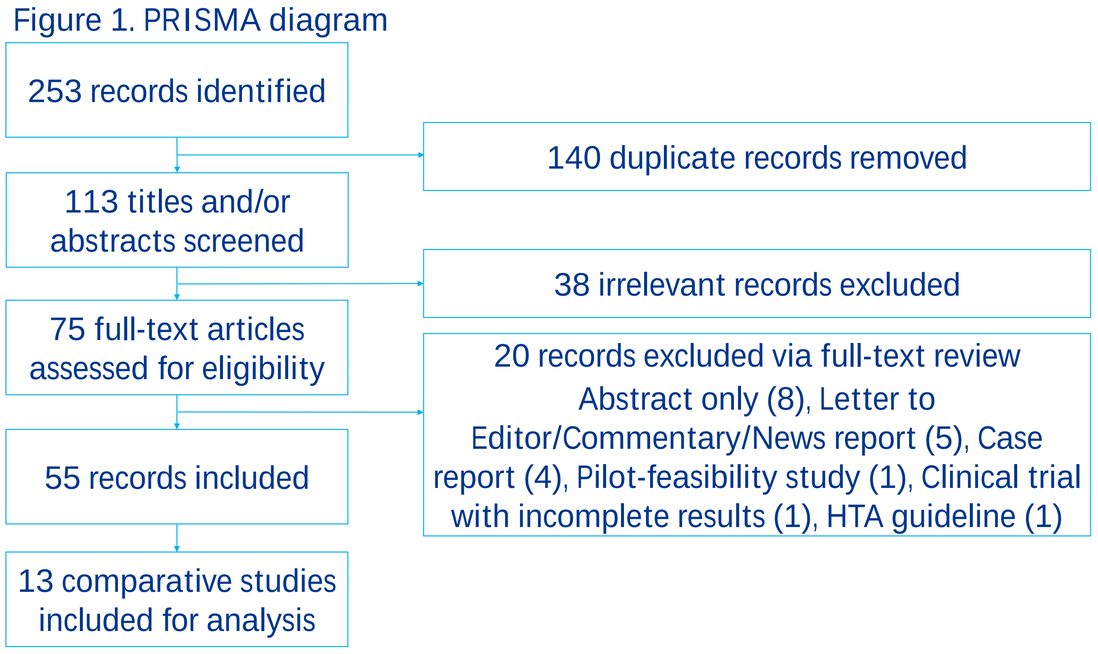
Table 1. PICOS strategy

Population	Patients with malignant and non-malignant ascites
Intervention	Indwelling peritoneal catheters (IPCs), implantable ports
Comparator(s)	Large volume paracentesis (LVP)
Outcomes	Clinical outcomes: Successful device deployment, successful drainage of the ascitic fluid, complications Resources utilization or cost outcomes: Re-admission rates, re-interventions and duration of hospital stay, cost Patient reported outcomes: Quality of Life (QoL), pain, convenience
Study design	Inclusion: Comparative and single-arm studies of any duration and with any number of patients, all IPC studies Exclusion: Case reports, malignant pleural effusion studies

Results & Discussion

- A total of 253 references were retrieved, and 55 studies were included (Figure 1). Quality assessment indicated that all included studies received rating as either good or fair. Thirteen studies assessed IPCs vs. LVP for MA and NMA, in different settings.[1-13]

Figure 1. PRISMA diagram



Clinical outcomes:

- Symptom relief can be achieved by using IPCs.[3]
- Infection is a common clinical endpoints investigated in these studies.[1-9] Despite LVP had a low infection rate per procedure (0.8%), The overall infection rates of IPCs was similar to LVP (7.5%), when patient is used as the outcome measurement.[4] The recent published study suggested that the incidence of spontaneous bacterial peritonitis did not significantly differ between two groups.[5]
- The mortality rate of the IPC group has been reported as lower or not significantly different from the LVP group.[5,6]
- Cellulitis/leakage (11%) were reported in the LVP group,[9] and the cellulitis/leakage was reported as 6%~41% in different studies.[2,9]
- Risk of removal due to complications like infection, leaking and chemical cellulitis varied across studies. 28 explants were reported due to infection within a 90-day follow-up among 151 implants.[5] A 21.4% removal was observed in the peritoneal ports group.[10] These may be attributed to longer dwell times and different profiles.[1,11]

Economics outcomes:

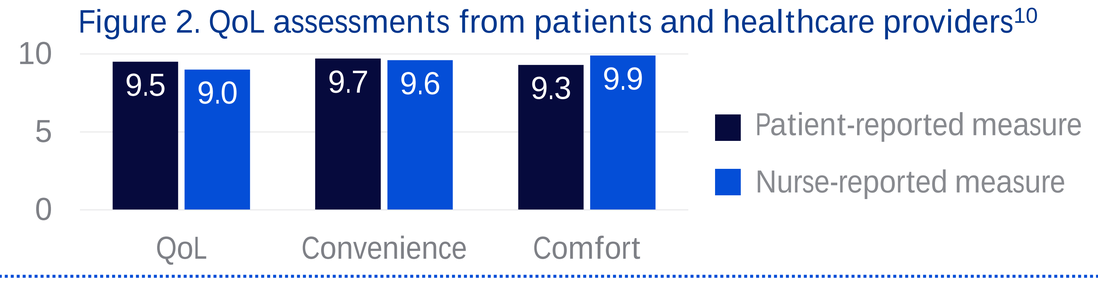
- IPCs has been suggested to be the more cost-effective strategy compared to LVP in patients with recurrent ascites from gynecological malignancy, as repeated LVP incurred higher expected costs. The health benefit of IPC was slightly lower than that of LVP (0.22980 versus 0.22982 QALY), and the cost was also lower ($3,043 versus $3,868).[11]

  Note: The economic data were mistakenly attributed to Wu et al. (2022) in Cardiovascular and Interventional Radiology, instead of the correct source—Wu et al. (2022) in Gynecologic Oncology, which provides the relevant subgroup data. We acknowledge this oversight and have corrected the reference accordingly
- Comparing IPCs to repeated LVPs in an inpatient setting resulted in an incremental cost saving of £679 per patient and release of 7.4 hospital bed days per patient.[3] The costing update in 2022 suggested that IPCs can save £44 more compared to the 2018 update.[12]
- IPCs might be more cost-saving solutions for patients who receive LVP more frequently or patients who have less than 5L of fluid drained per procedure.[13]

Humanisitc outcomes:

- A trend of positive attitudes of patients toward IPCs has been observed, particularly regarding convenience and control of ascites symptoms, and the ability to perform drainage at home. Nurses also viewed IPCs favorably in the qualitative research.[3,7]
- Both patients and nurses reported high scores for QoL improvements convenience, and comfort associated with peritoneal port use (Figure 2). Device-associated infection rates varied depending on the setting and patient condition.[10]

Figure 2. QoL assessments from patients and healthcare providers[10]



Conclusion

In summary, IPCs were well-tolerated, provided effective symptom relief, and were associated with improvements in quality of life (QoL) and convenience. The findings suggests that IPCs may offer QoL and economic advantages over LVP for managing MA and NMA. Therefore, IPCs could transform the care pathway by improving quality of life for these patients while reducing hospitalizations and the associated cost burden through broader adoption.

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