Case Report

Reduction in chemoport-related complications following protocol based quality improvement: A single-center audit

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Abstract

Background: Totally implantable venous access devices (chemoports) are indispensable in oncology practice but may be associated with infectious, thrombotic, and mechanical complications. We audited our institutional outcomes and assessed whether protocol-based quality improvement reduced complications.

Methods: A retrospective audit of chemoport procedures performed from January 2018 to February 2026 was conducted at a tertiary cancer center. Procedural approach, complications, and outcomes before and after protocol implementation in 2024 were analyzed.

Results: Fifty-four chemoports were inserted and 26 removed. Nineteen complete insertion-removal cases were included for complication analysis. Pre-protocol complication rate was 23.5%, including infections, thrombosis, malrotation, and catheter displacement. After implementation of a standardized protocol, complication rates reduced to 8%, with no malrotation or thrombotic events observed.

Conclusion: Standardized insertion and handling protocols significantly reduced chemoport-related complications and represent a practical quality improvement strategy.

Keywords: Chemoport; Venous access device; Complications; Quality improvement

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1. Introduction

Chemoports have become an integral part of cancer care by enabling reliable long-term venous access for chemotherapy, supportive medications, and blood sampling. Compared with repeated peripheral venipuncture, they improve patient comfort and facilitate treatment delivery. However, their use is not free of complications. Complications may occur during insertion or later during device use. Early events include pneumothorax, arterial puncture, and malposition. Late complications include infection, thrombosis, catheter occlusion, and migration. Reported overall complication rates vary widely, and many complications may be preventable through standardized technique and careful device handling.[1, 4]

Institutional audits are valuable in identifying patterns of complications and opportunities for quality improvement. This study reports our experience with chemoport complications and the impact of protocol implementation on outcomes.

2. Materials and Methods

A retrospective audit was performed of patients undergoing chemoport insertion and removal between 2018 and February 2026. From 2018–2021, ports were inserted predominantly through the cephalic vein approach. From 2022 onward, the internal jugular vein approach was adopted. A total of 54 insertions and 26 removals were identified. For detailed complication analysis, 19 complete cases in which insertion and removal were performed at our institution were analyzed.

2.1. Complications evaluated included:

- Infective complications
- Thrombotic complications
- Mechanical complications including malrotation and catheter displacement

In 2024, a protocol bundle was introduced including dedicated clean operating theatres, first-case scheduling, disposable draping, antibiotic prophylaxis, sterile C-arm draping, selected vancomycin use in neutropenic patients, autoclaved OT attire, and education of staff and patients regarding port handling. Complication rates before and after protocol implementation were compared descriptively.

Results: Among 19 complete evaluable cases, the pre-protocol complication rate was 23.5%.

2.2. Complications included:

Two infections

- One catheter thrombosis
- One catheter malrotation
- One catheter displacement

2.3. Additional handling-related issues

This rate was higher than expected based on published literature. Following protocol implementation, 25 subsequent insertions were performed. Only two local infections and one catheter displacement occurred. No thrombosis or malrotation was seen. The overall complication rate reduced from 23.5% to 8%. Device-removal-related complication rate in our audit was 8%, within reported range.

2.4. Catheter Displacement

One noteworthy complication was catheter displacement, a relatively uncommon but clinically relevant event. It presented with concern for port dysfunction and highlighted the importance of recognizing this rare complication early.

3. Discussion

This audit demonstrates a substantial reduction in chemoport-related complications following protocol-based quality improvement. Our initial complication rate was higher than commonly reported rates, likely reflecting multiple factors including procedural variability, theatre-related factors, and handling issues during chemotherapy administration. After implementation of a structured protocol, complications decreased markedly, suggesting that many events were preventable and related more to systems of care than to device failure alone.

Infectious complications remain one of the commonest causes of chemoport morbidity and device removal. Published catheter-related infection rates vary considerably. Improved sterile precautions and handling education likely contributed to the reduction observed in our series.[5,6] Transition to internal jugular access also appeared associated with reduction in thrombotic and mechanical events. This is consistent with literature supporting favorable catheter positioning and reduced mechanical complications with this approach.

Catheter displacement deserves special mention. Though uncommon, it can lead to dysfunction, thrombosis, arrhythmia, or embolic complications if unrecognized. Inclusion of this complication adds practical relevance to the audit and emphasizes the need for vigilance even for rare events.

The audit also underscores the value of simple bundled interventions. Dedicated clean operating theatre use, standardized draping, prophylactic antibiotics, and education required no major resource expansion but appeared to improve substantially.

4. Limitations

The study is limited by retrospective design, modest sample size, and single-center experience. Statistical power is limited, and larger studies would be valuable. Despite this, the findings support practical quality improvement measures that may be reproducible in similar oncology settings.

5. Conclusion

Chemoports remain safe and effective devices for long-term venous access. However, complications can be minimized through protocol-driven insertion practices, meticulous handling, and continuous audit. Implementation of a standardized protocol reduced complications from 23.5% to 8% in our experience and may help institutions move toward benchmark outcomes.

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