CHEST

The Use of Indwelling Tunneled Pleural Catheters for Recurrent Pleural Effusions in Patients With Hematologic Malignancies

A Multicenter Study

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BACKGROUND: Malignant pleural effusion is a common complication of advanced malignancies. Indwelling tunneled pleural catheter (IPC) placement provides effective palliation but can be associated with complications, including infection. In particular, hematologic malignancy and the associated immunosuppressive treatment regimens may increase infectious complications. This study aimed to review outcomes in patients with hematologic malignancy undergoing IPC placement.

METHODS: A retrospective multicenter study of IPCs placed in patients with hematologic malignancy from January 2009 to December 2013 was performed. Inclusion criteria were recurrent, symptomatic pleural effusion and an underlying diagnosis of hematologic malignancy. Records were reviewed for patient demographics, operative reports, and pathology, cytology, and microbiology reports.

RESULTS: Ninety-one patients (mean ± SD age, 65.4 ± 15.4 years) were identified from eight institutions. The mean × SD in situ dwell time of all catheters was 89.9 ± 127.1 days (total, 8,160 catheter-days). Seven infectious complications were identified, all of the pleural space. All patients were admitted to the hospital for treatment, with four requiring additional pleural procedures. Two patients died of septic shock related to pleural infection.

CONCLUSIONS: We present, to our knowledge, the largest study examining clinical outcomes related to IPC placement in patients with hematologic malignancy. An overall 7.7% infection risk and 2.2% mortality were identified, similar to previously reported studies, despite the significant immunosuppression and pancytopenia often present in this population. IPC placement appears to remain a reasonable clinical option for patients with recurrent pleural effusions related to hematologic malignancy. CHEST 2015; 148(3):752-758

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ABBREVIATIONS: HSCT = hematopoietic stem cell transplantation; IPC = indwelling tunneled pleural catheter; MPE = malignant pleural effusion

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Malignant pleural effusion (MPE) is a common complication of advanced malignancies and often associated with decreased quality of life and morbidity.[1,2] Advances in pleural palliation have led to the rather widespread adoption of the indwelling tunneled pleural catheter (IPC) as a tool for managing symptomatic, recurrent MPEs. This includes current British Thoracic Society guidelines, which offer a grade B recommendation for IPC placement as "effective in controlling recurrent and symptomatic malignant effusions in select patients."[3] IPC use has gained additional momentum after a randomized controlled trial demonstrated no significant difference in dyspnea scores at 6 weeks when comparing IPC with standard talc slurry.[4] Although only a small number of patients experienced significant adverse events, the overall incidence of infectious complications was approximately 25% in the IPC arm compared with 4% in the talc slurry arm.[4] Reports have identified IPC infection risks ranging from 4% to 10% in varying cohorts, including a large, international multicenter review[5]; in patients actively receiving chemotherapy[6,7]; and in an original single-center large series reporting on IPC placement.[8]

All these studies included rather heterogeneous etiologies of MPE, with most including some patients with hematologic malignancies. Patients with underlying hematologic malignancies may be at increased risk for complications related to common chemotherapeutic agents and underlying tumor biology.[9-11] To our knowledge, however, no study to date has focused specifically on this patient population, especially regarding the role of IPC placement for pleural palliation. In one large study, the incidence of MPEs related to hematologic malignancy was 20%[12]; however, little detail regarding their specific management or outcomes were offered. The aim of the current study was to review the clinical characteristics and outcomes of patients with hematologic malignancies undergoing IPC placement with a focus on pleurodesis and infectious complication rates.

Materials and Methods

A multiinstitution retrospective study of all pleural procedures resulting in IPC placement was performed at The Johns Hopkins Medical Institution, the Mayo Clinic, Duke University Medical Center, Swedish Cancer Institute, Hospital of the University of Pennsylvania, Virginia Commonwealth University Medical Center, Emory University, and Penn State-Milton S. Hershey Medical Center from January 2009 to December 2013. The institutional review boards of all centers approved this study (The Johns Hopkins Medical Institution, NA_00074178; Mayo Clinic, 13-009160; Duke University Medical Center, 00021763; Swedish Cancer Institute, 5566S-14; Hospital of the University of Pennsylvania, 819939; Virginia Commonwealth University Medical Center, HM20001126; Emory University Hospital, IRB00072194; Penn State Hershey-Milton S. Medical Center, 44826EM), and the requirement for informed consent for data collection and analysis was waived. Each patient underwent standard procedural consent for IPC placement per institutional practices and guidelines.

Data Collection

IPC placement was identified from patient databases using Current Procedural Terminology coding records and cross-referenced with operative reports. Inclusion criteria were placement of an IPC for recurrent pleural effusion and an underlying diagnosis of a hematologic malignancy (lymphoma, leukemia, multiple myeloma, or other). Exclusion criteria were incomplete medical records for analysis. Records were reviewed for patient demographics, operative reports, and pathology, cytology, and microbiology reports. Records of underlying hematologic malignancy, treatments, and hematologic laboratory values at the time of IPC insertion and infection were identified. Patient records were subsequently reviewed for evidence of pleural infection by queries regarding post-IPC placement pleural fluid cultures, clinic visits, hospital admissions, and death records. Radiologic and operative records were queried regarding pleural space physiology at the time of IPC insertion to document evidence of expandable or nonexpandable lung. IPC infectious complications were defined by the presence of pleural pus, positive pleural fluid Gram stain or culture requiring subsequent intervention (antibiotics, IPC removal, etc), or cellulitis requiring systemic antibiotics. Data regarding IPC removal, specifically the timing and reason for removal, were collected. In patients dying with the IPC in situ, the date of removal was calculated as the date of death. To calculate days of IPC use in patients without records of death or IPC removal, data were censored on December 31, 2013, the last date of data collection. Study data were collected and managed using REDCap electronic data capture tools hosted at the Penn State-Milton S. Hershey Medical Center.

Eight centers participated in data collection, with individual audit times depending on local record availability. All centers offer multidisciplinary care in thoracic oncology and are considered to have expertise in the management of MPEs and placement of IPCs. Some patient data were reported in previously published studies examining pleural space infections.[5,6]

Statistical Analysis

Statistical analysis was conducted using Microsoft Excel, version 14.4.2 (Microsoft Corporation) and Stata 13.1 (StataCorp LP) software. Simple descriptive statistics, including mean, range, and percentage, were

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