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Trends in hospice discharge, documented inpatient palliative care services and inpatient mortality in ovarian carcinoma

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HIGHLIGHTS

- Overall rate of hospice discharge and palliative care services is low but improving.
- One fifth of the patients who died in the hospital received palliative care services.
- One fifth of the patients with extreme risk of dying, but survived, were discharged to hospice.

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ABSTRACT

Objective. To investigate the trends in discharge to hospice, documented inpatient palliative care services, and inpatient mortality in metastatic ovarian cancer (mOvCa) patients.

Methods. Patients ≥ 18 years with mOvCa and a non-elective admission between January 1, 2006 and December 31, 2011 were identified from the National Inpatient Sample (NIS). The primary outcome of interest was the temporal trend in the annual proportion of hospitalizations for mOvCa where discharge destination was hospice. Secondary outcomes included temporal trend of inpatient mortality and documented palliative care services. Multivariable logistic regression models were used to ascertain independent factors predictive of hospice discharge and documented palliative services across the clusters of hospitals.

Results. A total of 106,203 non-elective hospitalizations were identified. The rate of hospice discharge increased from 9.2% in 2004 to 11.1% in 2011 ($p^{\text{trend}} < 0.001$). Similarly, the rate of documented palliative care services increased from 2.7% in 2004 to 10.4% in 2011 ($p^{\text{trend}} < 0.001$). The inpatient mortality decreased from 9.6% in 2004 to 7.4% in 2011 ($p^{\text{trend}} < 0.001$). In a subset of hospitalizations with extreme risk of dying, 22% were discharged to hospice and 11% received documented palliative care services. One fifth of the patients who died in the hospital received documented palliative care services.

Conclusions. The use of hospice as a discharge destination and documented palliative care services is relatively low but appears to be increasing over time for mOvCa patients. Monitoring this data is vital to plan educational programs regarding palliative care approaches in this at-risk population.

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1. Introduction

In 2016, an estimated 22,280 patients will be diagnosed with ovarian carcinoma [1]. More than 60% of patients are diagnosed in the advanced stage with an estimated 5-year survival of 28.3% [2]. Although recent advancements in both surgical management and chemotherapy have

led to an increased survival [3], most patients experience a relapse of disease and undergo multiple lines of treatment prior to death.

Given its high mortality rate, patients with advanced ovarian malignancy may benefit from early palliative care involvement as well as hospice services near the end of life (EOL). National Comprehensive Cancer Network guidelines recommend utilizing palliative medicine approaches earlier in the continuum of cancer care and cite literature dating to the mid-1990s [4]. Recent studies have shown a survival benefit with early palliative care involvement in lung cancer [5] and other solid tumors [6]. Despite emphasis on integrating palliative care in

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advanced solid tumor malignancies [4,7], significant disparities have limited its utilization due to hospital size and geographic variation [7].

Previous studies demonstrate that end-of-life care discussions often happen late [8] and after multiple health care transitions including multiple hospitalizations [9]. It has been shown that 31% of patients die awaiting transfer to hospice without benefitting from those services at the EOL. This study also looked into hospice referral practices and found that ovarian cancer patients lived only an average of 47 days with hospice care prior to death [10].

The majority of cancer patients at the end-of-life prefer comfort care [11,12] however, in the United States patients often receive aggressive care at the EOL [13]. Although up to 97% of patients who are dying realize that they are dying, only 40% of them will initiate EOL care discussions [14]. Resource utilization, including chemotherapy for ovarian cancer patients remains high within last two weeks of life [15] and the EOL discussions often happen late in the disease process [16]. It has been shown the timely palliative care consultations for patients with advanced gynecologic malignancies may be able to mitigate the use of aggressive care at the end of life [17].

The objective of this study was to investigate the trends in discharge to hospice, documented inpatient palliative care services, and inpatient mortality in metastatic ovarian cancer patients.

2. Methods

2.1. Data sources

The National Inpatient Sample (NIS) of the Healthcare Cost and Utilization Project (HCUP) data was utilized for this cross sectional analysis. The NIS is the largest publically available all payer inpatient database in the United States [18]. This dataset is a stratified sample of hospitals drawn from existing state databases that make their information available to the HCUP with data that can be matched to the American Hospital Association (AHA) annual survey of hospitals. Each discharge includes up to 15 inpatient diagnostic codes and 15 procedural codes. The first diagnostic code represents the primary reason of admission. All procedures and diagnoses are coded using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM).

2.2. Study population

Using the NIS discharges, we identified patients ≥ 18 years of age, with metastatic ovarian carcinoma and a non-elective admission between January 1, 2006 and December 31, 2011. We did not include data from 2012 onwards because the NIS discontinued the discrete capture of 'hospice' as a discharge destination starting in 2012. Additionally, the NIS also changed their sampling strategy in 2012 making it difficult to compare trends of newer datasets from those prior to 2012. In the NIS, each hospitalization is treated as an independent event even if it might represent a repeat admission of same patient. It is not possible to identify repeat patient admissions. Therefore, the denominator for all calculations in the total number of inpatient admissions. Sampling weights were applied to estimate the national population statistics as suggested by the Agency for Healthcare Research and Quality [19].

2.3. Patient, hospital and treatment factors

Patient level variables included in the study were age (<40, 40–49, 50–59, 60–69, 70–79 or ≥ 80 years), race (white, black, Hispanic or unknown/other), insurance status (Medicare, Medicaid, private insurance or unknown), and Elixhauser comorbidity score obtained from the secondary claim codes using methods described previously [20]. Elixhauser comorbidity scores were categorized as <3, 3–5 and >5. Inpatient risk of mortality during the current hospitalization was assessed using a four-point scale (AP-DRG mortality risk scale) that includes the risk

categories of minor (<2%), moderate (~2–5%), major (~20%) and extreme (~40% or higher) based on patient's estimated risk of death during a hospital stay [21]. This proprietary 4-point ordinal scale is derived from age, primary and secondary diagnoses, and procedures. This scale has been previously validated and predicts the risk of mortality in patients admitted to the hospital better than other methods [21,22]. This information was obtained from the all-patient refined diagnosis-related group (AP-DRG) which assesses risk of mortality using an algorithm developed by 3 M Health Information Systems.

Cancer characteristics that were collected include: primary cancer type, sites of metastasis (bone, liver, central nervous system, lung, lymphatics and/or others) and primary reason of admission (e.g. bowel obstruction, sepsis, etc.). Metastatic disease was ascertained using the administrative diagnostic codes using a methodology described previously that has provides 75–95% accuracy [23,24].

Hospital factors included in the study were hospital region (North-east, Midwest, South or West), location (rural vs urban), teaching status (teaching vs non-teaching), and hospital size as defined by the NIS (small, medium or large). Treatment factors included administration of chemotherapy during the current hospitalization, patient receipt of mechanical ventilation and/or placement of gastrostomy tube.

2.4. Outcomes

The primary outcome of interest was the temporal trend in the annual proportion of hospitalizations of metastatic ovarian cancer where discharge destination was hospice (including both inpatient hospice and home hospice). Secondary outcomes included the temporal trend in utilization of documented inpatient palliative care services and inpatient mortality. Documented palliative care services were identified using the ICD-9 code V66.7. The code was first introduced in 1996 and subsequent clarification are provided in the coding handbooks [25]. Finally, the independent effects of documented inpatient palliative care services on hospice discharge and inpatient mortality were studied using logistic regression modelling.

2.5. Statistical analysis

Descriptive statistics were used to summarize the patient characteristics. Linear changes in study variables over the time frame of the study (2006–2011) were assessed using a nonparametric trend test (Stata, nptrend) [26]. For patients surviving the hospitalization to discharge, factors associated with hospice discharge at a p-value < 0.10 in the univariate analyses in addition to other clinically plausible variables were included in multivariable analyses. A multivariable logistic regression model was used to assess variation in the odds of hospice discharge across hospitals. Factors considered in the model included patient factors (age, race, income, Elixhauser comorbidity, AP-DRG mortality risk and insurance status), tumor factors (site of metastasis, tumor causing bowel obstruction), facility factors (hospital region, urban vs rural facility type, hospital teaching status and year of diagnosis) and treatment factors (mechanical ventilator, gastrostomy tube insertion, chemotherapy administration). Similar analysis was performed to identify the determinants of receipt of documented palliative care services.

3. Results

A total of 106,203 non-elective hospitalizations were identified in patients with metastatic ovarian carcinoma between 2006 and 2011 across 1385 hospitals in the United States. Primary reasons for admission for these hospitalizations are summarized in Table 1. Respiratory failure, including pneumonia (16%), fluid, electrolyte and nutritional derangements (14%), and intestinal obstruction (14%) were the most common reasons of these non-elective admissions. Age distribution in years was <40 (3.6%), 40–49 (10%), 50–59 (20.7%), 60–69 (27.8%), 70–79 (22.6%) and ≥ 80 (15.2%) Race/ethnicity distribution was white (61%),

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