Restoration of Medical Oncology Services at LSU Interim Public Hospital in New Orleans After Hurricane Katrina: A Two-Year Experience of LSUHSC

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Background: Oncology services at Charity Hospital were discontinued following Hurricane Katrina in August 2005. Medical oncology and chemotherapy services resumed at the Louisiana State University Interim Public Hospital in 2007. Demographic, clinical, and displacement data of the re-established patient cohort were reviewed.

Methods: Patients evaluated in the Louisiana State University Health Sciences Center (LSUHSC) Oncology Clinics from September 1, 2007, to August 31, 2009, were identified and data collected included time from diagnosis of malignancy to initial oncology evaluation, insurance status, percentage displaced for six months or more due to Hurricane Katrina, ethnicity, referrals for radiation oncology, and the number of outpatient clinical encounters (OCE).

Results: 464 patients were evaluated in the study time period. Sixty-five percent of the patients had new cancer diagnoses and 35% re-established cancer care in the Charity System and a substantial proportion were either unfunded or had Medicaid coverage. Thirty-four percent were confirmed to be displaced from New Orleans for greater than six months and the majority of patients were black. The majority of new cancer diagnoses were breast, lung, and colon cancer. Human immunodeficiency virus (HIV) positive patients made up 7.5% of the patient cohort. There was a 70% decline in patient volumes following Hurricane Katrina.

Conclusions: Oncology services for a minority-based, underinsured patient population were severely impacted by Hurricane Katrina. Following the storm, persistent systemwide resource limitations led to suboptimal timeliness of medical oncology evaluations. Health care systems serving underinsured patients require a disaster plan to minimize interruption of oncology care. Our experience illustrates the need for resources to ensure rapid re-establishment of care for economically disadvantaged patients following natural disasters.

INTRODUCTION

Health care services for southeastern Louisiana were severely impacted by the effects of Hurricane Katrina which made landfall August 29, 2005. Citywide hospital capacity in New Orleans was reduced by 80% and most facilities in the affected area were forced to either close permanently or reduce delivery of care for various periods of time. Charity Hospital (CH) which was run by the Louisiana State University Health Care Services Division (LSUHCSD) provided care to a medically underserved patient base in the metropolitan New Orleans area; 85% of patients had incomes at or below poverty level. CH provided 83% of uncompensated care in New Orleans with multiple subspecialty outpatient clinics and 500 staffed inpatient beds. Storm-induced flooding of New Orleans post-Katrina caused irreparable damage to CH resulting in its permanent closure. Prior to Hurricane Katrina, the CH-based Louisiana State University Health Sciences Center (LSUHSC) Oncology Clinics had an average of 3,750 patient encounters per year with an active chemotherapy infusion facility.
The long term disruption caused by the storm led to uninsured and underinsured patients receiving care throughout the United States in an ad hoc manner for several years. Medical care previously provided at CH was reconstituted at the LSU-IPH on November 2006, with services initially focused on inpatient acute and trauma care with 85 inpatient beds made available. Medical oncology and chemotherapy services were established at LSU-IPH on September 1, 2007, while on-site radiation oncology services remain unavailable. Demographic and diagnostic data of the reestablished oncology patient cohort for the initial two year period of LSUHSC Oncology Clinic activity were reviewed to establish potential financial and systemic barriers affecting access to cancer care; patients served by the Tulane University Health Sciences Center (TUHSC) Oncology Clinic at the LSU-IPH were not included in this analysis.

**METHODS**

Patients evaluated in the LSUHSC Oncology Clinics from September 1, 2007, to August 31, 2009, were identified. Data collected included time from diagnosis of malignancy to initial medical oncology evaluation, cancer diagnoses, insurance status, ethnicity, and referrals for radiation oncology. Additionally, we identified the percentage of patients who were displaced from their homes in the metropolitan New Orleans area for six months or more due to the effects of Hurricane Katrina. Demographic and diagnostic data were not available for the pre-Hurricane Katrina patient cohort due to the effects of the storm. However, the volumes of outpatient clinical encounters (OCE) were available for fiscal years 2004-2005.

**RESULTS**

After approval was obtained from the LSUHSC Institutional Review Board, 464 patients were identified as having been cared for in the LSUHSC Oncology Clinics for the study period. The majority of the patient cohort had a new diagnosis of cancer (302, 65%) and the remaining 162 patients (35%) were re-establishing care from the CH Oncology Clinic. Analysis of insurance status showed that 44% were insured by Louisiana Medicaid, 13% by Medicare and 43% had either no medical insurance or were eligible for LSU-IPH provided free care. Sixty-two percent of patients were black and 25% white. The majority of patients were diagnosed with tumors of the breast, colon, or lung; 7.5% of the patient cohort was diagnosed with HIV/acquired immune deficiency syndrome (AIDS), and 4% of the total cohort had an AIDS-defining malignancy (eg, Kaposi’s Sarcoma, non-Hodgkin lymphoma, or invasive cervical cancer) (Figure 1).

For the 302 patients newly diagnosed with malignancy, the mean time from pathologic confirmation of malignancy to initial medical oncology evaluation was 59 days; pre-Hurricane Katrina values are unavailable for review. Thirty percent of patients were referred to outside facilities for radiation oncology reimbursed by either Louisiana Medicaid or the LSU-IPH. A plurality (34%) of the patient cohort were confirmed to be displaced by the storm for greater than six months. Additionally, there was a 70% decline in patient volume serviced by the LSUHSC Oncology Clinic following Hurricane Katrina. For fiscal years 2004 and 2005, there were 4,468 outpatient clinical encounters (OCE) and 3,348 OCE, respectively. Following Katrina, there were 52 OCE in 2007, 662 OCE in 2008, and 1725 OCE in 2009 (Figure 2).

**DISCUSSION**

In medically underserved areas barriers to care include lack of medical insurance and travel restrictions...
to medical facilities; both factors clearly result in lack of adherence to diagnostic and therapeutic interventions for acute and chronic medical conditions.\textsuperscript{5,6} Further, the care of patients receiving palliative or curative treatment for cancer necessitates detailed follow up as clinical outcomes may be significantly impacted by lack of close adherence to therapy.\textsuperscript{7,9}

Following Hurricane Katrina, timely delivery of medical care was limited by nontransferable insurance coverage such as state issued Medicaid, lack of patient knowledge and inaccessible medical records. Formal provisions for the transfer of care in a vulnerable patient population are lacking in the event of a catastrophic natural disaster.\textsuperscript{10,11}

However, with close and coordinated follow up the short term outcome for patients with chronic medical conditions may not necessarily be adversely impacted in the event of a mass evacuation as was demonstrated in the case of dialysis dependent patients after Hurricane Katrina.\textsuperscript{12,13}

Prior to the storm, medical oncology care at the LSUHSC Oncology Clinic at CH was delivered by the fellows and faculty of the LSUHSC-New Orleans Section of Hematology/Oncology. Additionally, TUHSC cared for approximately 50\% of CH oncology patients via the Tulane Oncology Clinic. As a result of the storm, LSUHSC-NO voluntarily suspended operations of the fellowship program after being reduced to one full-time faculty member. Reestablishment of medical oncology services at the LSU-IPH was delayed until sufficient faculty were recruited for adequate participation in restoration of services in 2007.

Post-Hurricane Katrina system and citywide recovery efforts have resulted in the slow restoration of patient volumes to the LSU-IPH. The average two month delay from diagnosis of malignancy to medical oncology evaluation is not ideal and results mainly from two factors. First, systemic delays stemming from lack of clinical staff have resulted in slow transfers of care of unfunded patients diagnosed outside of the LSU-IPH. Secondly, the multi-disciplinary management of cancer requires participation of medical, surgical, and radiologic specialties universally impacted post-Katrina at both a faculty and housestaff level. Furthermore, a substantial proportion of medical care delivered at the LSU-IPH is done by residents and fellows, supervised by the faculty of LSUHSC and TUHSC. Training programs continue to return to pre-Hurricane Katrina levels. For example, the LSUHSC radiology residency and hematology/oncology fellowship programs were re-instituted in 2009 and 2010, respectively.

Linear accelerator facilities used for the delivery of radiation therapy at CH were destroyed due to the flooding of the hospital and radiation oncology has not been restored at the LSU-IPH. Instead, services are contracted out by the LSUHCSD to several private practice facilities in the metropolitan New Orleans area in a fee for service arrangement. In this review, 42\% of the 140 patients in the patient cohort referred for radiation therapy required the simultaneous administration of chemotherapy, most commonly for head and neck or thoracic malignancies. The logistical and financial challenges imposed on patients by the geographic dispersal of chemotherapy and radiation services often leads to poor compliance with treatment. Patients frequently are unable to afford the daily transportation costs imposed by concurrent chemoradiotherapy programs. Functional limitations imposed by both malignancy and toxic therapies substantially impact a patient’s ability
to travel. For example, a patient receiving six weeks of daily radiation therapy for a head and neck malignancy may require weekly administration of chemotherapy and intermittent administration of supplemental intravenous fluids. The complexity imposed by this treatment regimen often adversely impacts compliance to therapy.

The patient population served by the LSUHSC Oncology Clinics is primarily black, with a smaller percentage of Vietnamese (1%), and Hispanics (4%). The clinic patient demographics mirror the ethnic makeup of post-Hurricane Katrina New Orleans, which had a population of 67% black and 28% white in 2006.\textsuperscript{14} The 70% decline in patient volumes served by the oncology clinics mirrors the loss of population in metropolitan New Orleans after the storm, which the US Census Bureau estimates as a 54% decline from the year 2000 to 2006.\textsuperscript{14} Thirty-four percent of the post-Hurricane Katrina oncology clinic patient cohort were confirmed via chart review or direct patient survey to be displaced from metropolitan New Orleans for more than six months by Katrina. The authors suspect that this percentage is a marked underestimate of the actual number resulting from the retrospective nature of this review and is impacted by the lack of documentation in the medical record, an inability to confirm histories due to patient deaths, or patients being lost to follow up.

While it is difficult to quantify the impact of non-accessible medical records on patient care, the remotely accessible electronic medical record more widely used post-Katrina in the LSUHCSD hospital system now allows for easier transfer of care to alternate hospitals within the system. Additionally, the LSU-IPH Oncology Clinic instituted a policy of providing medical records and treatment histories to patients actively receiving treatment in the event of an predictable natural disaster, a program piloted prior to the evacuation of metropolitan New Orleans for Hurricane Gustav in September 2008.

It is clear that a prospectively established disaster plan for the rapid re-establishment of cancer services is necessary in the event of prolonged closure of public medical care facilities in areas vulnerable to natural disasters. Major components of such a disaster plan for this patient cohort would include an algorithm for rapid transfer of care for patients actively receiving radiation and/or chemotherapy to minimize interruptions of care. In the public hospital setting such a transfer could be to other instate public hospitals. If state facilities are unavailable, preplanned, fee-for-service relationships between the state providing free care and private facilities could be established, in much the same fashion that radiation services are provided at the LSU-IPH. As outlined previously, transfer of care is also impeded by lack of transferability of medical records. This difficulty is now mitigated by an electronic medical record linking six public hospitals in the LSUHCSD. In absence of a fully nationally linked electronic medical record system (eg, the Veterans Affairs’ Computerized Patient Record System), transfers of medical information to other state or private hospital systems will continue to delay care.

The experience of the LSUHSC Section of Hematology / Oncology demonstrates the substantial acute and long term impacts of Hurricane Katrina on both training programs and the delivery of care to an underserved patient cohort. The complexity associated with cancer therapies mandates that provisions of care be clearly and prospectively established by hospital systems in the event of prolonged mass evacuations.

**REFERENCES**


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