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Mortality within 30 days following systemic anti-cancer therapy, a review of all cases over a 4 year period in a tertiary cancer centre

L. Khoja, A. McGurk, C. O'Hara, S. Chow, J. Hasan *

The Christie NHS Foundation Trust, Wilmslow Road, Manchester M20 4BX, UK

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Abstract ***Background:*** The national confidential enquiry into patient outcomes and death (NCEPOD) set important benchmarks in assessing the quality of care received by patients dying within 30 days of systemic anticancer therapy (SACT). Monthly morbidity and mortality audits conducted to recommendations in the NCEPOD were commenced at the Christie NHS Foundation Trust in 2009, specifically to assess and improve patient outcomes.
Methods: We evaluated the outcomes of patients who died within 30 days of SACT over a 4 year period 2009–2013. We collated audit findings to determine the number of treatment related deaths, clinical characteristics of patients, causes of death and quality of care received. We examined the benefit of the audit in decreasing 30 day mortality during the 4 years and considered factors that may be associated with an increased risk of SACT related death.
Results: A total of 31,183 patients were treated at the Christie from 2009 to 2013. Of these 4% died within 30 days of SACT. Death was treatment related in 11%. The decision to treat with SACT was appropriate in 87% of but there was room for improvement in care in 24%. Mortality decreased over the 4 years. Possible factors associated with 30 day mortality post SACT included performance status $\geqslant 2$, presence of comorbidities, treatment type and treatment setting.
Conclusions: We demonstrated that our audit process is feasible and robust. Further areas of research to determine predictive scores for patient treatment selection and improve outcomes were highlighted and are ongoing.

* *Corresponding author:* Tel.: +44 1614463000.
E-mail address: jurjees.hasan@christie.nhs.uk (J. Hasan).

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1. Introduction

In 2006 the national confidential enquiry into patient outcome and death (NCEPOD) was carried out examining the care of patients in the United Kingdom who died within 30 days of receiving systemic anticancer therapy (SACT) [1]. The study was conducted to investigate concerns by the Department of Health that the quality of care was not of a consistently high standard across the United Kingdom (UK). The aim of that study was to assess the process of cancer care for patients who died within 30 days of SACT. Six key areas were defined to determine the quality of care; (1) appropriateness of the decision to treat with SACT, (2) process of care in the prescribing and administration of SACT (3) safety of care in the monitoring of toxicity and managing complications (4) end of life care (5) communication (patient information, multidisciplinary team (MDT) working and (6) clinical governance, clinical audit and risk management issues. The Department of Health's Manual for Cancer Services (against which the delivery of the chemotherapy service was assessed), the Clinical Oncology Information Network project guidelines on effective clinical practice in oncology, the British Committee for Standards in Haematology chemotherapy guidelines and the National Institute for Health and Clinical Excellence cancer service guidelines were used as standards for assessment of clinical care. Mortality within 30 days of the last SACT was used as the primary endpoint.

The results were published in 2008. Of 47,000 patients treated over 12 months 2% patients died within 30 days of SACT. Of these 35% received good care, 49% had room for improvement of care, 8% received less than satisfactory care and in 27% treatment caused or hastened death (categories were determined by study reviewers analysing the raw data; discussing each case and assigning a category to each patient). The NCEPOD report set important benchmarks in the UK and was the first large scale study into outcomes out with clinical trials. Several key recommendations were made; decisions to treat should be made at MDT meetings especially for patients of performance status $\geqslant 3$, chemotherapy prescribers should be trained and accredited to prescribe and consent for chemotherapy and all deaths within 30 days of SACT should be discussed at a morbidity and mortality meeting as part of ongoing clinical governance and risk management.

At our institution, one of the largest in Europe, the SACT 30-day mortality audit, conducted monthly according to recommendations set out in the NCEPOD report, was instituted in 2009. Here we set out to evaluate the outcomes of our patients who died within 30 days of SACT over a 4 year period from 2009 to 2013. Our aim was to review the quality of patient care using NCEPOD benchmarks from decision to treat, to prescription and administration of SACT and management of post-SACT disease or treatment-related complications that led to patient death. In addition we sought to examine the possible benefit of the audit process in decreasing 30 day mortality/treatment related mortality (TRM) year on year during the 4 year study period.

2. Methods/study design

2.1. Setting

A retrospective cohort study was carried out at the Christie Cancer Centre (CCC) NHS Foundation Trust in Manchester, UK. The Christie is the principal provider of cancer chemotherapy services for Greater Manchester and shares responsibility for in-patient care with local acute or district general (non-cancer specialist) hospitals (DGH) when patients are admitted to these hospitals with disease or therapy-related complications.

2.2. Identification of cases

The hospital informatics department generates a list of patients who are recorded on the patient administration system as having died in a given month. The list overestimates the number of relevant cases as it is based on death alone, it is screened to exclude cases out with defined criteria and the list is then sent to the responsible clinician for review. Criteria for review include patients who were aged $\geqslant 16$ years; had solid tumours or haematological malignancies; received intravenous, oral, subcutaneous, intravesical, intrathecal or intraperitoneal chemotherapy, monoclonal antibodies or immunotherapy and who died within 30 days of receiving SACT, either in hospital, hospice or at home. Patients who received vaccines, gene therapy and hormonal agents were excluded as were patients who attended for review only and did not receive treatment. The 30 day period is defined as 30 days from day 1 of SACT cycle immediately prior to death or if SACT was continuous as 30 days from the date of the last prescription. Patients who failed to attend their clinic appointment but who may have been on treatment would thereby be excluded.

2.3. Review process and data collection

Each case is reviewed by the responsible clinician and an audit form completed per case. Data are collected on: age, sex, performance status (at time of SACT before death), diagnosis, SACT received, the number of lines of previous chemotherapy, the number of cycles of the last course of SACT, intent of treatment; palliative or curative, appropriateness of treatment, if the patient had phoned the 24 h patient hotline (a 24 h telephone line staffed by specialist nurses to provide clinical advice to unwell patients at their instigation) prior to death or admission and if death was treatment related or not