Cancer Epidemiology 36 (2012) 217–221

Contents lists available at ScienceDirect

Cancer Epidemiology

The International Journal of Cancer Epidemiology, Detection, and Prevention

journal homepage: www.cancerepidemiology.net

Socio-economic inequalities in testicular cancer survival within two clinical studies

Ula Nur [a,*], Bernard Rachet [a], Mahesh K.B. Parmar [b], Mathew R. Sydes [b], Nicola Cooper [c], Sally Stenning [b], Graham Read [d], Tim Oliver [e], Malcolm Mason [f], Michel P. Coleman [a]

[a] Cancer Research UK Cancer Survival Group, Department of Non-Communicable Disease Epidemiology, London School of Hygiene and Tropical Medicine, Keppel St., London WC1E 7HT, UK
[b] Cancer Group, MRC Clinical Trials Unit, Aviation House, 125 Kingsway, London WC2B 6NH, UK
[c] National Cancer Intelligence Network, Co-ordinating team, Portland House, Bressenden Place, London SW1E 5RS, UK
[d] Royal Preston Hospital, Preston PR2 9HT, UK
[e] Barts Cancer Institute, Barts and the London School of Medicine, Queen Mary University of London, London EC1M 6BQ, UK
[f] Cardiff University School of Medicine, Cardiff CF14 4XN, UK

ARTICLE INFO

Article history:
Received 16 June 2011
Received in revised form 28 July 2011
Accepted 30 July 2011
Available online 3 September 2011

Keywords:
Cancer survival
Deprivation
Cancer registries
Testicular cancer
Relapse
Carboplatin

ABSTRACT

Background: Testicular cancer is the most common cancer in men under 35 years of age, and has the highest survival for adult male malignancies. Despite the fact that survival is very high, there is evidence that survival differs between socio-economic groups. *Methods*: We analysed survival patterns for 1606 testicular cancer patients diagnosed during 1984–2001 and recruited to one of two clinical studies. The first was a surveillance study to determine relapse-free survival after orchidectomy in 865 patients with stage I nonseminomatous germ-cell testicular cancer diagnosed during 1984–1991 (TE04). The second study was a trial in which 1174 men with stage I seminomatous germ-cell tumours were randomised to receive radiotherapy or one injection of carboplatin between 1996 and 2001 (TE19). The number of men available for analysis from these two studies was 578 and 1028, respectively. We followed these patients up for their vital status, and assigned them an ecological measure of deprivation. Crude and relative survival were estimated at 5 and 10 years by socio-economic deprivation. *Results*: No significant socio-economic gradient was seen: 1.3% (95% CI −0.3% to 3.1%) at 5 years and 2.1% (95% CI −0.5% to 4.7%) at 10 years. *Conclusion*: We conclude that, given equal treatment at a given stage of disease, survival from testicular cancer does not depend on socio-economic status. This suggests that the socio-economic gradient in testicular cancer survival in the general population is more likely to be attributable to health care system factors than to personal or socio-economic factors in the men themselves.

1. Introduction

Cancer survival in England and Wales differs between socio-economic groups for most adult cancers [1], and in many populations [2]. 5-Year survival for adults from deprived areas was significantly lower than that of patients from affluent areas for most of the major 47 cancers [3]. Despite the fact that survival from testicular cancer is high, socio-economic differences in survival were demonstrated for men diagnosed in England and Wales during the early 1970s [3], after adjustment for background mortality with life tables specific for each socio-economic group. Further evidence of socio-economic inequalities was confirmed in men with testicular cancer diagnosed during the late 1990s [4]. Differences in stage at diagnosis and access to treatment partly explain the socio-economic inequalities in cancer survival, but it is less clear why these differences arise [5].

Patients who take part in cohort studies or clinical trials fit strictly defined eligibility criteria and receive the same mandated treatment and follow-up, with close adherence to the study protocol. One would not expect the treatment received within each trial arm to vary between socio-economic groups, because the socio-economic status of the men was unknown at recruitment to the cohort study or randomisation in the trial.

The aim of this study was to measure any socio-economic differences in survival among men with testicular cancer recruited to two clinical studies. A socio-economic survival gradient within these study populations would imply that biological factors explain the survival gradient in the general population, while the absence of such a gradient would imply that access to treatment or other healthcare system factors are more likely to explain the inequalities in survival in the general population.

* Corresponding author. Tel.: +44 20 7927 2091; fax: +44 20 7436 4230.
E-mail address: ula.nur@lshtm.ac.uk (U. Nur).

1877-7821/$ – see front matter © 2011 Elsevier Ltd. All rights reserved.
doi:10.1016/j.canep.2011.07.008

2. Materials and methods

The Medical Research Council (MRC) Clinical Trials Unit (CTU, formerly the MRC Cancer Trials Office) conducted the original testicular cancer studies, TE04 and TE19 (ISRCTN27163214).

The TE04 was a prospective single-arm cohort study which aimed to determine the rate of relapse and its predictive histological criteria among patients treated by orchidectomy alone for stage I nonseminomatous germ-cell testicular tumour (NSGCT). The patients were recruited from 16 United Kingdom centres and one Norwegian centre between January 1984 and October 1991, and attended follow-up assessment at monthly intervals for the first year, every 2 months for the second year and every 3 months for the third year, and regularly thereafter. The MRC Clinical Trials Unit constructed a dataset on a total of 865 men, of which 768 were registered in England or Wales between January 1984 and October 1991. Overseas patients and patients resident in Scotland were excluded because no information on their postcode of residence was available. Results for the first 396 men recruited between January 1984 and October 1987 confirmed the effectiveness of surveillance for the management of stage 1 NSGCT and identified a group of patients with high risk of relapse on histological criteria [6].

In the TE19 trial, 1477 patients from 70 hospitals in 14 countries with stage 1 seminomatous germ-cell tumours were randomly assigned by the MRC Clinical Trials Unit or the EORTC (European Organisation for Research and Treatment of Cancer) to receive either radiotherapy or one injection of carboplatin following orchidectomy. Relapse-free survival rates were compared between the trial arms. Carboplatin proved to be an effective adjuvant treatment and similar in outcome to radiotherapy [7] with respect to relapse rates. All non-UK patients were excluded, and a final dataset on 1174 men of whom 1112 were resident in England and Wales was prepared for analysis.

The Office for National Statistics (ONS) flagged patients on the National Health Service Central Register and provided information on their vital status (alive, dead, emigrated or lost to follow-up) up to 31 December 2008. The ONS also provided the postcode of the patient's residence at diagnosis, from which they were assigned to one of five deprivation categories (from 1 'most affluent' to 5 'most deprived'). Individual information was not available on the socio-economic status of these cancer patients; instead the Carstairs index [8], an ecological measure of deprivation based on four census-derived variables at the level of the census enumeration district (ED), was used to assign a deprivation category to patients diagnosed 1984–1995. The deprivation category was based on the 1981 census for men diagnosed 1984–1985 and 1991 census for men diagnosed 1986–1995. One of the four Carstairs components was changed in the 2001 census, and therefore was not comparable to that used in 1981 and 1991. The ONS introduced the Indices of Multiple Deprivation (IMD) in 2000. This new index is mostly based on routine administrative data and is regularly updated. It has already been shown that the choice of the deprivation index has little impact on the deprivation gap [9]. The ONS also changed the geographic level enumeration district (ED-mean population 450) to the larger but more socially homogenous level of the Lower Super-Output Areas (LSOA) (mean population 1500) in 2001. For those diagnosed during 1996–2001, deprivation categories were defined from the income domain score of the (IMD2004) [10] using administrative data of the 34,378 LSOAs in England. For patients in Wales, we used the equivalent Welsh index [11].

Of the 1880 patients resident in England or Wales initially considered for analysis, a further 274 patients (190 from TE04 and 84 from TE19) were excluded, either because their postcode was missing, which meant that their socio-economic status could not be defined, or because their vital status was unknown, i.e. patients who were not known to be dead, but whose records could not be traced to enable 'flagging' by the end of follow-up time, or because the record failed ONS validity checks, i.e. one of the mandatory fields required by ONS was not correct (Fig. 1).

Patients consented to join both studies. Multi-Centre Research Ethics Committee approval for this additional use of the data was obtained from West Midlands MREC for TE19 in 2006 and the MREC for Wales for TE04 in 2005. Approval was obtained for this study from the Ethics Committee of the London School of Hygiene and Tropical Medicine.

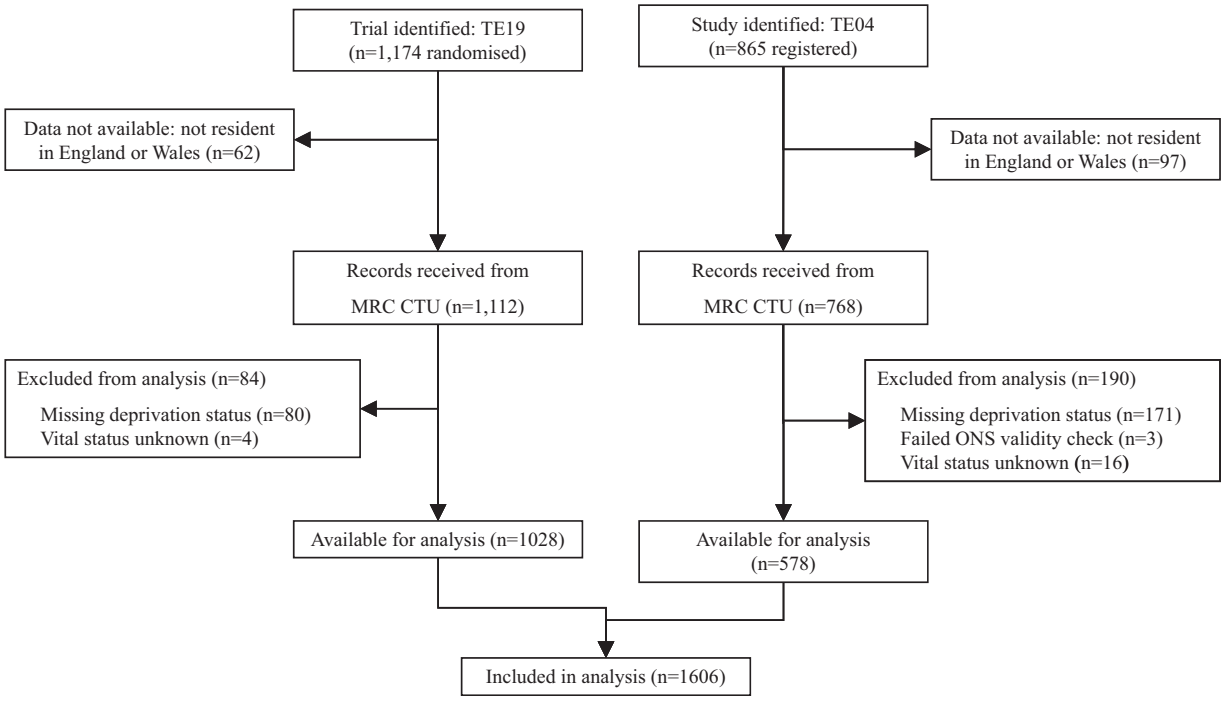

Fig. 1. Distribution of patients in the two clinical studies (TE04 and TE19).