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SURVIVAL AND MORTALITY IN PROSTATIC CANCER

A study based on the Swedish cancer register

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Abstract

A total of 44 300 cases of prostatic cancer, comprising 99% of all newly diagnosed living cases reported to the Swedish Cancer Registry in 1960 through 1978 constituted a cohort followed up for 1–19 years. Survival rates were adjusted for expected mortality in the general population and were expressed as relative survival (RS). RS for the total cohort after 5, 10 and 20 years was 51, 34 and 17% respectively, with an annual excess death rate of about 8% which persisted also after long-term observation. RS was similar in age groups between 45 and 74 years, whereas among patients older than 74 years at diagnosis approximately 10% lower RS appeared early and was persistent. RS improved for patients diagnosed at consecutive 5-year periods. Thus, the high mortality rate in old age groups and the low long-term RS contradicted the concept that biologically inactive tumours constitute a significant proportion of prostatic cancers diagnosed in clinical practice.

Key words: Prostate cancer, epidemiology, cancer registry, relative survival, Sweden.

The incidence of and the mortality from prostatic cancer in Sweden are among the highest in the world. The incidence is now over 100 per 100 000 men, which means that the incidence of cancer of the prostate in men is higher than the incidence of cancer of the breast in women (1). Cancer of the prostate is also the most common malignancy in males. The incidence is extremely age dependent; the incidence in age groups over 80 is over 1 000/100 000. In contrast, only occasional cases are recorded below the age of 50.

Treatment of prostatic cancer is controversial both for localized and advanced disease. Autopsy studies have shown the prevalence of preclinical prostate cancer to be very high: 8–30% for the age group 60–69 and 20–70% for the age group 70–79 (2, 3). These figures indicate the occurrence of latent (2) cancers with low pathological activity. Morphologically, it is not possible to distinguish a so-called latent cancer from a tumour with known progressive course.

The high incidence of latent cancers in old age should influence survival analysis towards a better survival for older age groups. In this respect, previous studies have been contradictory (4–6).

It was, therefore, of interest to investigate the long-term survival of patients with prostatic cancer and the influence of age and year of diagnosis on the prognosis. The study could also contribute to a better understanding of the natural history of this disease.

Material and Methods

The availability in Sweden of computerized registers for living persons, for causes of deaths and the Swedish Cancer Registry enables an almost complete follow-up of all cancer patients.

The Swedish Cancer registry was established in 1958. All cases of cancer diagnosed at hospitals or other institutions are notified to the registry. In addition, pathologists and cytologists report separately to the registry. In most cases, the registry, thus, receives reports from two sources.

The files from the cancer registry are annually linked to the Causes of Death Registry (7). Additional information in this study was obtained by linking the cancer registry with an updated registry of all living persons in

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Sweden. Acceptance of the linkage was possible by the unique personal identification numbers given to all persons domiciled in Sweden.

The observed survival rates from diagnosis of prostate cancer to death from any cause were calculated according to the life table method (8).

The specific prostate cancer mortality was obtained from calculating the relative survival (9). The relative survival is the ratio between the observed survival rate and the survival rate expected for persons in the general population with an age distribution corresponding to the studied group. Thus, the relative survival estimates the probability of dying from prostatic cancer adjusting for the general mortality in the population. In the period from 1960 through 1978, prostatic cancer was diagnosed in 44 900 living men. For 44 300 (99%) of these, we had complete follow-up whereas 606 could not be identified in all registers.

Results

A detailed description of the cohort has previously been published (10). The observed and relative survival is seen in Fig. 1. The observed survival rate was 34.8% at 5 years, 14.2% at 10 years and 1.9% at 20 years. The corresponding relative survival rates were 51.0%, 33.7% and 17.0% respectively. If there was no increased mortality for patients with prostate cancer compared to the matched age group, then the relative survival had remained at 100%. Thus, the presented results reveal a high mortality rate for prostatic cancer patients during the whole period of observation.

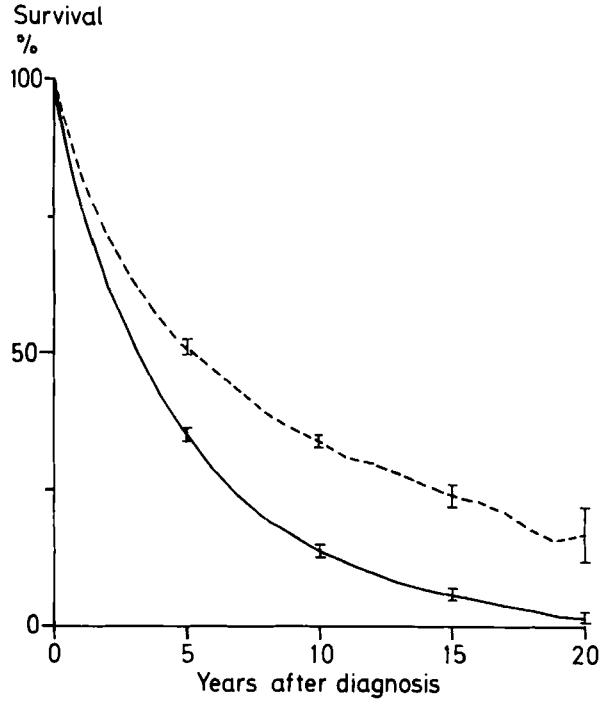

Fig. 1. Observed (—) and relative (- - -) survival rates, with 95% confidence limits, in 44 300 patients with prostatic cancer diagnosed 1960–1978.

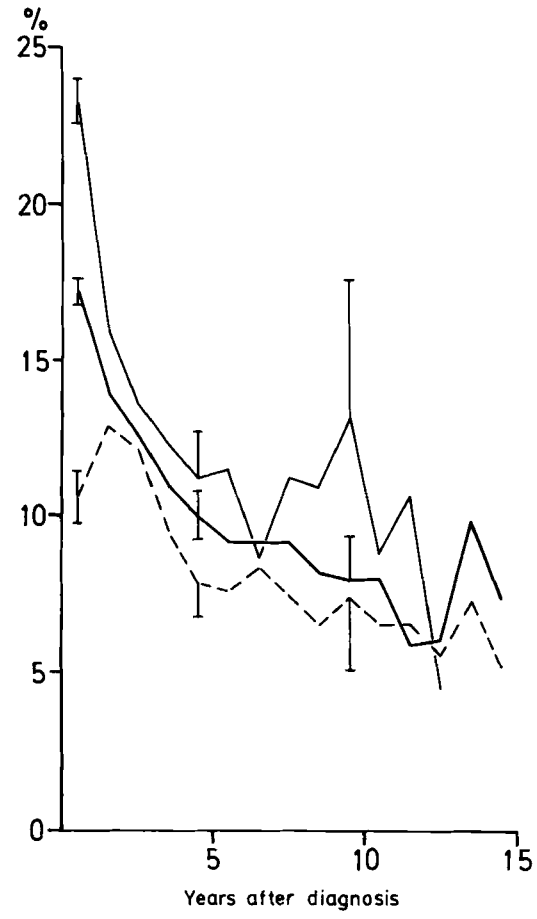

Fig. 2. Annual hazard rates, with 95% confidence limits, by age at diagnosis. (——) all ages; (- - -) 55–64 years; (——) ⩾75 years.

The continuing decrease in the relative survival rate is further analyzed in Fig. 2 which shows the annual hazard rate in the whole cohort for each year of observation. There is a continuous improvement in the probability of survival during the first 5–6 years after diagnosis, but thereafter the curve levels off with an annual excess death rate remaining at about 8%.

The influence of age at diagnosis on the relative survival rate is seen in Fig. 3. The 5-year relative survival rate for the age group 35–44 years was only 34.2% which is lower than for all other age groups. However, the group includes only 28 patients and so the calculations are strongly influenced by random variation.

For the three age groups 45–54, 55–64, and 65–74 years at diagnosis, the relative survival was almost the same. However, the relative survival for the age group over 75 years was significantly lower throughout the follow-up period. The relative survival was fairly similar for the age

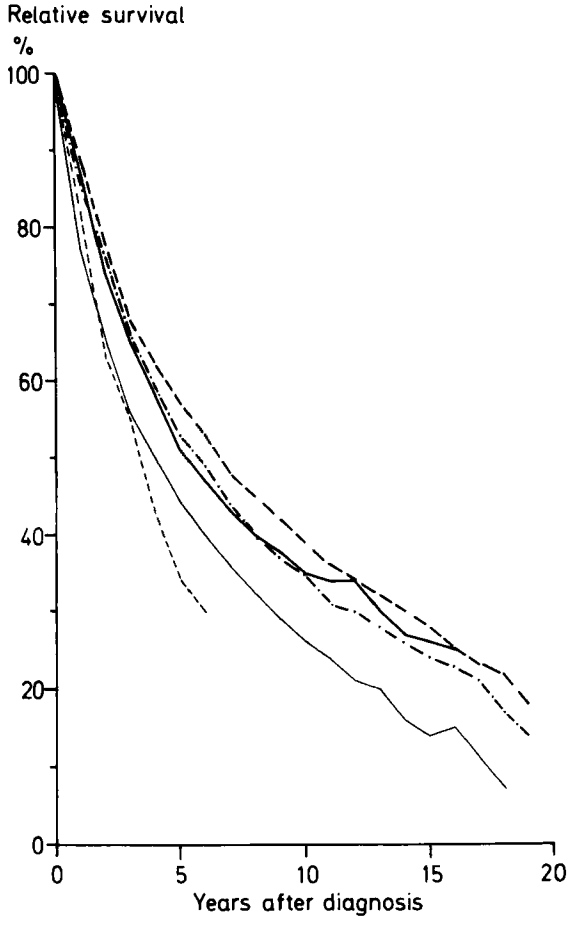

Fig. 3. Relative survival rates by age at diagnosis. (- - -) 35–44 years; (—) 45–54 years; (– – –) 55–64 years; (— · — ·) 66–74 years; (—) ⩾ years.

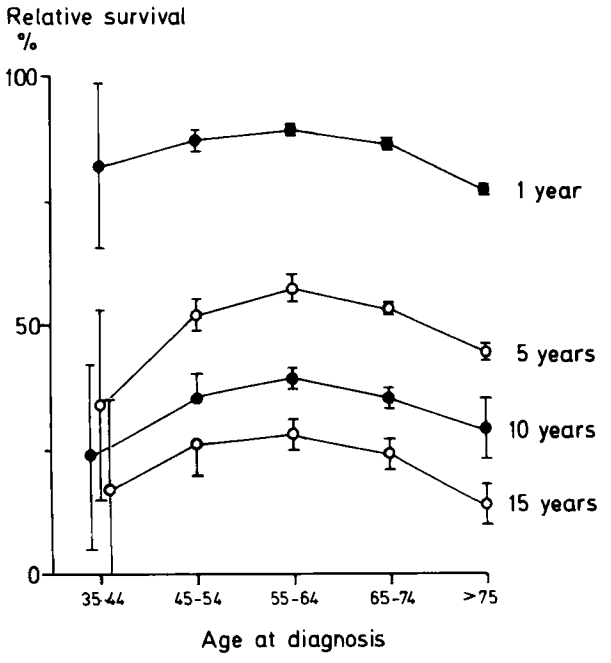

Fig. 4. Relative survival rates at defined periods of observation, by age at diagnosis. Vertical lines indicate 95% confidence limits.

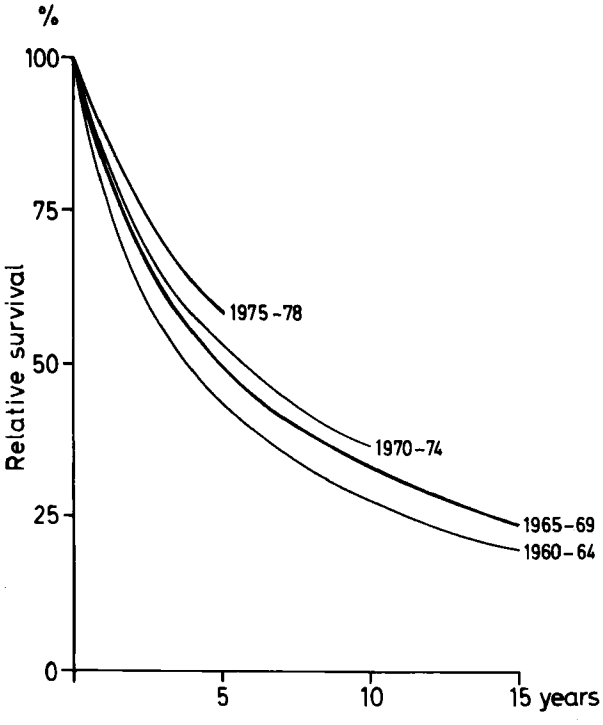

Fig. 5. Relative survival rates for patients diagnosed 1960–1964, 1965–1969, 1970–1974 and 1975–1978.

groups 45–54, 55–64 and 65–74 years. However, the large number of patients permitted a more detailed assessment (Fig. 4). Thus, men in the age group 55–64 experienced a significantly better relative survival rate than younger and older age groups at all times of observation.

The relative survival rate for patients diagnosed at consecutive 5-year periods are seen in Fig. 5. The relative 5-year survival was about 20% higher for patients diagnosed during the period 1975–1978 compared to 1960–1964.

Comments

The low relative survival 10–15 years after diagnosis of prostate cancer and the 8% annual excess death rate after long-term observation contradicts the concept that biologically inactive tumours constitute a significant proportion of prostatic cancers diagnosed in clinical practice.

If a substantial number of latent cancers were included in the cases reported to the cancer registry older patients should have a better relative survival than younger. The opposite was found in this study, which contradicts the concept that biologically inactive cancers are diagnosed in clinical practice.

The better relative survival experienced for every consecutive 5-year period, is probably multifactorial. Introduc-

tion of fine-needle aspiration biopsies in diagnosis, modern TUR-techniques for treatment, and better availability of medical service in the community, will all result in a higher proportion of localized tumours in the prostatic cancer material. Controlled clinical trials for evaluation of the impact of treatment of prostatic cancer is a necessity.

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REFERENCES

1. Cancer Incidence in Sweden. The Swedish Board of Health and Welfare, Stockholm.
2. Franks LM. Latent carcinoma of the prostate. J Pathol Bacteriol 1954; 68: 603–16.
3. Solber I, McGavran MH. Adenocarcinoma of the prostate in men less than 56 years old: A study of 65 cases. J Urol 1971; 105: 283–5.
4. Cook GB, Watson FR. A comparison by age of death rates due to prostate cancer alone. J Urol 1968; 100: 669–71.
5. Rosenberg SE. Is carcinoma of the prostate less serious in older men? J Am Geriatr Soc 1965; 13: 791–8.
6. Smedley MH, Sinnoth M, Freedman LS, Macaskill P, Naylor CPE, Pillers EMK. Age and survival in prostatic carcinoma. Br J Urol 1983; 55: 529–33.
7. The Swedish National Central Bureau of Statistics, Causes of Death 1960–1979. Annual publications for 1960–1979. Stockholm, 1962–1981.
8. Culer S, Ederer F. Maximum utilization of the life table method in analyzing survival. J Chron Dis 1958; 8: 699–710.
9. Monson RR. Analysis of relative survival and proportional mortality. Comput Biomed Res 1974; 7: 326–52.
10. Adami HO, Norlén BJ, Malker B, Meirik O. Long-term survival in prostatic carcinoma with special references to age as a prognostic factor. Scand J Urol Nephrol 1986; 20: 107–12.