

Prostate Cancer Screening with PSA

A Study of Potential Negative Consequences

AKADEMISK AVHANDLING

som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien vid Göteborgs Universitet kommer att offentlig försvaras i Stora aulan, Sahlgrenska Universitetssjukhuset
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Leg. Läkare

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Avhandlingen baseras på följande delarbeten:

I. Jonas Hugosson, **Sigrid Carlsson**, Gunnar Aus, Svante Bergdahl, Ali Khatami, Pär Lodding, Carl-Gustaf Pihl, Johan Stranne, Erik Holmberg and Hans Lilja. Mortality results from the Göteborg randomised population-based prostate-cancer screening trial.

Lancet Oncol. 2010 Aug; 11(8): 725-32.

II. **Sigrid Carlsson**, Gunnar Aus, Catrin Wessman and Jonas Hugosson. Anxiety associated with prostate cancer screening with special reference to men with a positive screening test (elevated PSA) – Results from a prospective, population-based, randomised study.

Eur J Cancer. 2007 Sep; 43(14): 2109-16.

III. **Sigrid Carlsson**, Erik Holmberg, Sue M. Moss, Monique J. Roobol, Fritz H. Schröder, Teuvo L. J. Tammela, Gunnar Aus, Anssi P. Auvinen and Jonas Hugosson. No excess mortality after prostate biopsy – Results from the European Randomized Study of Screening for Prostate Cancer.

BJU Int. 2010; *In press.* (doi: 10.1111/j.1464-410X.2010.09712.x.)

IV. **Sigrid Carlsson**, Jan Adolfsson, Ola Bratt, Jan-Erik Johansson, Christer Ahlstrand, Erik Holmberg, Pär Stattin and Jonas Hugosson. Nationwide population-based study on 30-day mortality after radical prostatectomy in Sweden.

Scand J Urol Nephrol. 2009; 43(5): 350-6.

V. **Sigrid Carlsson**, Gunnar Aus, Svante Bergdahl, Ali Khatami, Pär Lodding, Johan Stranne and Jonas Hugosson. The excess burden of side-effects from treatment in men allocated to screening for prostate cancer. The Göteborg randomised population-based prostate cancer screening trial.

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Abstract

Prostate Cancer Screening with PSA – A Study of Potential Negative Consequences

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Aims: The Göteborg randomized population-based prostate cancer screening trial is a prospective study evaluating the efficacy of prostate-specific antigen (PSA)-based screening and its effect on prostate cancer mortality. The potential negative consequences in relation to the benefits for men undergoing this screening are explored in this thesis.

Methods: As of December 31, 1994, there were 32,298 men born between Jan 1, 1930 and Dec 31, 1944 (ages 50-64, median 56 years) living in the city of Göteborg. Of these, 20,000 men were randomly allocated in a 1:1 ratio to either a screening group or to a control group. This population constitutes the basis for this thesis. The cumulative incidence of prostate cancer and prostate cancer mortality were calculated and analyses made by intention-to-screen. Anxiety levels were assessed in screen-positive men. Short-term overall mortality after prostate biopsy was studied. Perioperative mortality after radical prostatectomy was evaluated from registry linkage with the follow-up study of the National Prostate Cancer Register (NPCR) 1997-2002. Side-effects from radical prostatectomy were evaluated for men in the screening study who underwent radical prostatectomy at Sahlgrenska University Hospital between 2001-2008.

Results: A PSA-based screening program reduced the relative risk of prostate cancer mortality by 44% over 14 years. Overall, 293 men needed to be invited for screening and 12 to be diagnosed to prevent one prostate cancer death. Attending a screening program for prostate cancer is seldom associated with severe negative psychological distress, even for men with persistently elevated PSA levels. The risk of excess fatal complications after biopsy of the prostate is low. Radical prostatectomy is a procedure with very low perioperative mortality throughout the whole of Sweden. With 14 years of screening, for each prostate cancer death averted, the surgically induced morbidity due to screen-detected prostate cancer will render four men impotent or sexually inactive, and less than one man incontinent.

Conclusions: PSA screening significantly, and substantially, reduces prostate cancer mortality. This benefit compares favorably to other cancer screening programs. The potential negative consequences of such screening may be acceptable in the light of a disease-specific mortality reduction. The risks of severe consequences from the screening procedures and radical prostatectomy seem minor, but the risk of negatively influencing the sexual performance may be substantial. The outcome on a population level may differ from the benefit for the individual.

Keywords: prostate cancer; screening; mortality; early detection; anxiety; 30-day mortality; prostatectomy; Prostate-Specific Antigen; prostate biopsy; impotence; urinary incontinence
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