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Commentary

Effect of Risks Arising Due to Over Diagnosis to Detect Early Cancer

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DESCRIPTION

Increasingly sensitive screening and diagnostic techniques may lead to higher cancer detection rates than indicated by incidence/mortality rates from central registries of many types of cancer. This may reflect the impact of lead times, but if the cumulative impact persists, it may reflect over diagnosis. This phenomenon is problematic for many clinicians and pathologists, and left untreated, many recognized cancers may not have progressed to documented morbidity and mortality. Over diagnosis is defined as the detection of a cancer by a screening or diagnostic procedure that would not otherwise cause illness or death.

With few exceptions, continuously growing cancers are eventually biopsied and reported to epidemiological cancer registries. Cumulative incidence between a representative subpopulation screened and the population-wide registry if the length-biased sample adequately reflects tumour growth rates after considering lead times and confounding variables should be approximately equal over time if the screened group originally had increased prevalence due to increased early detection of cancer. Early diagnosis rates should show some reduction in mortality.

If these cumulative incidences are dissimilar, it may raise questions about the potential for over diagnosis of non-fatal cancers as screening cohorts increase, resulting in ethical, cost, and other technical concerns problems may occur. In contrast, effective cancer screening involves early detection of potentially lethal cancers or their precursors, reducing morbidity and mortality. Effective screening should lead to lower cancer-specific mortality and lower age-adjusted incidence of advanced cancer. However, over diagnosis has been reported in many clinical and screening settings, including skin screening for melanoma and squamous or basal cell carcinoma, mammographic screening and testing, colorectal cancer screening, and prostate cancer.

In addition to live rates, relatively large increases were found among different types of lesions. This is the case for Ductal Carcinoma (DC) associated with breast mammography and other *in situ* cancers such as gastrointestinal tract, genital tract and cutaneous prostate cancer, colon and Squamous cell Carcinoma (SCC), Basal Cell Carcinoma (BCC) types and cutaneous melanoma. In South Korea, the over diagnosis rate of thyroid cancer is very high. Incidence and mortality data for cervical, prostate, oral, and thyroid cancers suggest over diagnosis, and melanoma and renal trends are associated with potential increased actual risk. On the other hand, trends in cervical and breast cancer also suggest improvements in treatment and prior diagnosis.

Subpopulations screened for melanoma showed both higher detection and in situ to infiltration rates than expected from population-based registry data, without lower than expected melanoma mortality. Questions have long been raised about the rising incidence of melanoma and whether non-fatal, non-metastatic melanoma is being diagnosed. Thus, a vocabulary has emerged that includes over diagnosis, the asymptomatic reservoir of the indolent state, and the stationary and non-metastatic forms of melanoma.

It has been suggested that over diagnosis may be the result of common screening tests. And with the advent of more sensitive diagnostic techniques, the likelihood of occurrence in the diagnostic environment is even higher and increasing. There is evidence that lower thresholds for performing biopsies among clinicians and pathologists have led to changes in diagnostic thresholds, which collectively lead to higher case detection rates and clearer success brought the statue. The clinical significance of cancers detected during screening becomes more questionable in the absence of corresponding reductions in morbidity and mortality. Contrasting public health recommendations were made and increased screening associated with increased reporting.

It has been suggested that the over diagnosis rate may be due to changes in pathological diagnostic thresholds combined with increased screening. When a pathologist presented his 20-year-old slides, the diagnostic rate for melanoma increased. While this is a significant change, it does not explain the significant increase in melanoma diagnoses.

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Underlying this phenomenon of over diagnosis is the perception that screen-detected cancers have inconsistent biological behaviour. Some screen-detected cancers are valid diagnoses with pathological verification but may not progress to clinical significance. Biological behaviour and cell proliferation rates are not necessarily shared by cancer types. This is supported by autopsy studies showing the proportion of hidden cancers that have not caused morbidity, mortality or been diagnosed throughout life.