Diagnostic Imaging in the Staging of Prostate Cancer

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Summary and Conclusions

Prostate cancer is the most common form of cancer in Sweden and the most common cancer-related cause of death among Swedish men. The purpose of this report is to evaluate the use of diagnostic imaging techniques in determining the spread, or staging, of newly diagnosed prostate cancer prior to treatment selection.

This report assesses the diagnostic imaging techniques of magnetic resonance tomography (MRT), positron emission tomography (PET), and positron emission tomography with computed tomography (PET/CT). These techniques can be used to assess the local extent of the tumour, i.e. whether it is limited to the prostate gland, has grown outside the prostate gland (T stage), or if the tumour has spread to nearby lymph nodes (N stage).

Current clinical examination practices used to establish the T stage are considered by many physicians to be unreliable and variable based on who performs the examination. In order to determine whether the cancer has spread to the lymph nodes, N stage, it is currently necessary to surgically remove the lymph nodes, which can cause complications. Thus, there is a need for more reliable and less invasive methods of staging.

Diagnostic imaging techniques have been adopted for staging in a number of Swedish counties, making it important to evaluate their diagnostic reliability, as well as how the diagnostic process affects patient survival rates and quality of life after treatment. In studies with long follow-up intervals, the technical information may have become obsolete, however the clinical results in the form of survival rates and changes in quality of life may still be valuable.

Conclusions

This report assesses different diagnostic imaging techniques (magnetic resonance tomography, positron emission tomography, and positron emission tomography with computed tomography to assess local tumour extent, i.e. whether it is limited to the prostate gland itself, or if it has grown outside the prostate gland (T stage), or spread to the nearby lymph nodes (N stage).

- **Overall:** Staging is important in the choice of treatment strategy. There is no scientific evidence for the benefits of the diagnostic imaging techniques. There is no support for using resources for the routine use of these techniques without following them up scientifically. Systematically documented experience gained through use of these techniques contribute to their continuous development.

- **Use and benefits:** Diagnostic imaging is used at many medical facilities in Sweden in order to stage prostate cancer (T and N categories). However, it is not currently possible to assess whether this leads to an increased survival rate or better quality of life since there are no relevant studies.

- **Performance of the techniques:** It is not possible to determine how reliable the techniques are for the correct staging of prostate cancer. The limited evidence available shows that examinations using positron tomography with simultaneous CT scan using one of the trace elements (11^{C} choline) provides a relatively high to high specificity (84–98%), while the technique's sensitivity is lower and more uncertain (45–84%) for the assessment of the N stage for persons with intermediate and high risk tumours.

- **Potential risks:** As the reliability of these techniques is still uncertain, it is possible that their use will lead physicians to make misguided decisions that could adversely affect patient health. It is therefore important that the person interpreting the images and the treating doctor are aware that the reliability of these diagnostic techniques has not been determined. Patients examined with these techniques must also be informed about these reliability issues.

- **Economic aspects:** The cost of one examination using MRT is approximately SEK 6,500 and PET/CT around SEK 17,000. It is not currently possible to assess whether it is cost-effective to use these diagnostic imaging techniques because their reliability and effects on patient health are still unclear. Since prostate cancer is a common disease, and resources are limited, the increased use of diagnostic imaging in staging prostate cancer could displace other patient groups, putting them at a disadvantage.

- **Continued research:** In order to address how patient health is affected, randomized studies of the various diagnostic techniques are required in which survival rates, symptoms and quality of life are followed up for a very long time after treatment. In order to assess the diagnostic accuracy of the imaging techniques, more high quality studies are required that follow patients forward in time (prospective). Several reviewers must also make assessments independently of each other and of other information (blinding). In future research, all parts of the studies – trial subjects, diagnostic techniques and comparisons – must be better described.

Project group

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