

## **TRUS-guided prostate needle biopsy**

The only method to obtain a representative prostate sample for the histological and definite detection of prostate cancer is the ultrasound-guided needle biopsy, involving the systematic removal of samples from the apex, the centre and the base of the prostate from both lobes of the prostate. A minimum of 10-12 samples, each of which should be at least 1 cm in length, is recommended. The procedure itself is performed on an outpatient basis; antibiotic treatment (gyrase inhibitor) must be started one day before the procedure and continued for an additional 3 days. A saturation biopsy is performed in cases where no tumour was detected in the first or a second needle biopsy, but the PSA level is still elevated or continues to rise. In this case, 20-30 samples are taken and a prostate carcinoma can ultimately be detected in 30-43% of the patients previously diagnosed as tumour-free.

Complications requiring clarification include bleeding after the procedure and prostatitis; however, these occur in less than 1% of the cases when the procedure is performed by an experienced surgeon.

## **MRI diagnosis and MRI-guided prostate biopsy**

Where the PSA level is elevated and the presence of a prostate carcinoma is therefore suspected after excluding other causes for the pathological level, such as inflammations, the next step to be taken is a prostate biopsy, since only a histological examination allows reliable statements as regards tissue consistency. In some patients, however, the tissue obtained by means of ultrasound-guided biopsy appears to be normal, but the presence of a prostate carcinoma is still suspected. In such cases, a diagnostic MRI examination can provide further insights. MRI is a sensitive method for the morphological visualisation of the prostate and the detection of prostate cancer. Where the diagnostic magnetic resonance imaging (MRI) of the prostate reveals unusual results which should be confirmed by means of a biopsy (removal of samples) to clarify whether it is a malignant disease (prostate cancer) or a benign, inflammatory change of the prostate, a targeted MRI-guided prostate biopsy can be performed, since ultrasound examination methods do not allow for a visualisation or a targeted biopsy of these findings.

University Hospital Tübingen offers two high-quality biopsy techniques:

- Direct MRI-guided prostate biopsy (in the MRI scanner)
- Robot-assisted (Biobot™) biopsy with ultrasound/MRI fusion

## **MRI-guided prostate biopsy**

Where the diagnostic magnetic resonance imaging (MRI) of the prostate reveals unusual results which should be confirmed by means of a biopsy (removal of samples) to clarify whether it is a malignant disease (prostate cancer) or a benign, inflammatory change of the prostate, a targeted MRI-guided prostate biopsy can be performed, since ultrasound examination methods do not allow for a visualisation or a targeted biopsy of these findings. In contrast to saturation biopsy (in which up to 40 samples are taken), this technique requires no anaesthesia and in contrast to conventional ultrasound-guided biopsy, only 2-4

cylindrical samples are removed, which involves far less stress and pain for the patient. This technique is aimed at the targeted, high-precision removal of samples. Owing to years of experience and interdisciplinary collaboration between urology and radiology, the biopsy only takes about 25 minutes (adjustment of the biopsy system to the suspicious finding and targeted sampling). We perform the biopsy at a magnetic field strength of 3 tesla without using an endorectal coil, since we simultaneously have the diagnostic image material at our disposal. Directly before starting the examination, the physician, who has many years of experience in performing biopsies, positions a small sheath in the rectum. The suspicious area is accessed through the rectum by means of the sheath. The position of the sheath is corrected following quick MRI measurements. Once the sheath is positioned correctly in relation to the suspicious area, the biopsy needle is introduced and the needle biopsy is performed, which usually involves no pain. This means that, similarly to the conventional ultrasound-guided biopsy, the prostate biopsy is performed through the rectum, avoiding a long access path via the perineum, which is usually painful and requires local anaesthesia or even general or spinal anaesthesia.

### **Who can be examined? What needs to be considered before the examination?**

As a general rule, MRI examinations or biopsies cannot be performed in patients with cardiac pacemakers. If you have an artificial heart valve, a cochlear implant or an artificial hip joint, the radiologist has to clarify before the examination whether these implants are MRI-compatible. To this end, we need your implant card; please bring it with you on the date of the examination!

### **MRI examination**

The actual examination including biopsy takes about 20-40 minutes.

If you suffer from claustrophobia, you can be given the sedative lorazepam (e.g. Tavor® s.l.) about 30 minutes before the examination. As a side effect of this medicine, you will feel tired and your general reaction time will be reduced significantly, which is why you will not be allowed to drive a car or actively participate in road traffic for the rest of the day and must arrange for someone to pick you up.

At our department, MRI-guided prostate biopsy is performed in collaboration between urology and radiology. Owing to our many years of experience in the field of MRI-guided prostate biopsy, complications associated with a biopsy, such as infections and bleeding, are minimised.

Prostate biopsy is currently not included in the scope of services of statutory health insurance funds.

### **Benefits of MRI-guided prostate biopsy:**

- Avoidance of anaesthesia and any associated risks
- Biopsy is performed in a targeted manner instead of “blind”
- Minimised risk of infection
- Minimised risk of bleeding
- Clear diagnosis for the patient after only one session

