Continuing Medical Education

Options for Curative Treatment of Localized Prostate Cancer

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Summary

Background: Prostate cancer is the most frequently occurring malignancy among men in Germany, with 60 000 new cases each year. Three of every four tumors are detected at an early, localized stage, when various curative treatment strategies are possible.

Methods: A selective search of the literature in PubMed accompanied by consideration of guidelines from Germany and other countries.

Results: Owing to the usually prolonged natural course of localized prostate cancer, local treatment is recommended for patients with a life expectancy of at least 10 years. The established treatments with curative intent are radical prostatectomy, percutaneous radiotherapy, and brachytherapy, with active surveillance as a further option for patients with low-risk disease. The eventual choice of treatment is determined by tumor stage, risk group, comorbidities, and patient preference. Conversations with the patient must cover not only the oncological outcome but also the potential adverse effects of the different treatment options. Depending on the procedure, urinary incontinence, erectile dysfunction, and inflammation of the bladder and/or rectum may be frequently occurring complications.

Conclusion: A number of curative and other treatments are available for patients with localized prostate cancer. The goal is to identify the appropriate option for each individ<ual patient by means of detailed discussion.

Cite this as:
Knipper S, Ott S, Schlemmer H-P, Grimm M-O, Graefen M, Wiegel T:
Options for curative treatment of localized prostate cancer. Dtsch Arztebl Int 2021; 118: 228–36.
DOI: 10.3238/arztebl.m2021.0026

Prostate cancer (PCa) is the most commonly occurring malignancy among men in Germany, with around 60 000 new cases each year (1). This corresponds to a lifetime PCa risk of 10.9% (one man in nine) (1). Three of every four tumors are detected at an early stage, when curative treatment is feasible (1, 2). The mean age at diagnosis is around 71 years, and the lifetime risk of dying from PCa is 3.3% (one man in 30) (1). Because of the usually slow rate of progression of PCa, curative treatment is recommended only for patients with sufficiently long life expectancy—depending on the tumor stage, this should be at least 5–10 years (2, 3). Individual estimations of life expectancy are extremely difficult: here, data from the Federal Statistical Office may be relied on (4).

This article presents the findings of a selective literature survey, with particular reference to the German clinical practice guidelines together with internationally recognized guidelines issued by European and American professional bodies (the European Association of Urology [EAU], the American Association of Urology [AUA], and the National Comprehensive Cancer Network [NCCN]).

Learning goals

After studying this article, the reader should be able to:

- Define localized prostate carcinoma
- Understand the importance of multiparametric magnetic resonance imaging (mpMRI) in diagnosing the disease

Introduction

Because localized prostate cancer usually progresses only slowly, local treatment or active surveillance is recommended in patients with a life expectancy of 10 years or more.

Staging

The choice of local treatment depends on the tumor stage, the comorbidities, and the patient's preference. The established options are active surveillance, radical prostatectomy, brachytherapy, and percutaneous radiotherapy.

- Name the local treatments options recommended for each risk group in the guidelines, together with the potential adverse effects

Staging

The TNM classification divides PCa into three stages: Localized PCa is a T1–2 N0 M0 tumor, i.e., confined to the prostate with no clinical sign of extracapsular extension or metastases. A tumor is categorized as locally advanced whenever the capsule has been penetrated or seminal vesicles or adjacent organs have been infiltrated (T3–4 N0 M0), or lymph node metastases are found in the minor pelvis (N1).

The category M1 (distant metastasis) describes advanced or metastasized PCa (5).

This article delineates the role of mpMRI in the staging of PCa and outlines the curative treatments (active surveillance [AS], radical prostatectomy [RP], percutaneous radiotherapy, brachytherapy [BT]) that are available for localized tumors (cT1–2c N0c M0). At this time, the risk classification and the indications for the various forms of treatment depend not only on the clinical stage but also on the Gleason score (assessment of tumor aggressiveness based on examination of a diagnostic biopsy sample). The system most widely employed for risk classification is that of D'Amico (6), which can be used to estimate the cancer-specific risk of death after definitive treatment *(Table 1)*.

The choice of treatment in each individual case depends on the tumor stage, the comorbidities, and the patient's preference. Detailed consultation with a urologist and/or a radio-oncologist is advisable. Discussions should embrace not only the oncological result but also the potential adverse effects of each form of treatment, which may include impairment of continence and erectile function as well as chronic infection of the bladder and rectum.

TABLE 1

Risk classification of localized prostate cancer according to D'Amico (6)

Risk group	Parameters
Low risk	PSA ≤ 10 ng/mL and Gleason score 6 (Gleason grade group I) and cT category 1c, 2a
Intermediate risk	PSA > 10 to ≤ 20 ng/mL or Gleason score 7 (Gleason grade groups II and III) or cT category 2b
High risk	PSA > 20 ng/mL or Gleason score ≥ 8 (Gleason grade groups IV and V) or cT category 2c

PSA, Prostate-specific antigen

Role of mpMRI in primary diagnostics

Multiparametric MRI is currently the most precise imaging procedure available for the investigation of suspected abnormalities of the prostate (pooled negative predictive value: 90.8%) (7). A multicenter study demonstrated the superiority of mpMRI to systematic prostate biopsy (8). Performance of mpMRI alone is insufficient, however, as the diagnosis of PCa has to be confirmed by histopathology. In the multicenter randomized PRECISION study (9), the initial pathological diagnosis was found to improve after introduction of MR/transrectal ultrasound (TRUS) fusion biopsy and the ensuing targeted tissue sampling (12% higher detection of clinically significant tumors, −13% detection of clinically insignificant tumors). MR/TRUS fusion biopsy comprises conventional TRUS-guided sampling, but with previously acquired mpMRI images superimposed on the ultrasonographs during the biopsy procedure.

Furthermore, mpMRI is also the most precise imaging procedure currently available for assessment of the T category. The sensitivity and specificity for detection of extracapsular extension (T3) have been reported as 66% and 88%, respectively (10). The initial diagnostic power, assessment of prognosis, and individual treatment decisions are thus better than with conventional diagnostics by means of randomized TRUS biopsy. For this reason, the latest version of the German clinical practice guideline advises use of mpMRI during the initial diagnostic work-up and before AS (recommendation strength B, evidence level 4) (2). However, the costs are not universally covered by the German statutory health insurance funds.

The Prostate Imaging Reporting and Data System (PI-RADS) classification comprises a five-point Likert scale and was developed to enable standardization of examination and documentation of the findings. With a PI-RADS score of 1 the presence of a tumor is highly improbable, while a score of 5 on the PI-RADS scale means that a tumor is very likely (11).

Depending on the risk classification bone scintigraphy (if PSA exceeds 10 ng/mL) and cross-sectional imaging (abdominal CT or MRI) are routinely recommended for staging purposes in all high-risk tumors (2).

The TNM classification divides prostate cancer into three stages:

- Localized PCa (T1–2 N0 M0)
- Locally advanced PCa (T3–4 N0 M0 or N1 M0)
- Advanced or metastasized PCa (M1)

The importance of mpMRI in the primary diagnostic work-up

mpMRI is currently the most precise imaging procedure available for the investigation of suspected abnormalities in the prostate (pooled negative predictive value: 90.8%).

Established treatment options

Active surveillance (AS)

AS is a strategy to delay—and ideally avoid altogether—local treatment and its potential adverse effects. The aim is to avoid overtreatment of early-stage tumors without decreasing the cure rate (2). The German clinical practice guideline therefore recommends AS in low-risk cancers that fulfill the following criteria (recommendation strength A, evidence level 4) (2):

- PSA < 10 ng/mL
- Gleason score ≤ 6 (Gleason grade group I, highly differentiated carcinoma)
- cT1, cT2a
- Tumor found in two or more of 10–12 diagnostic punch biopsy samples obtained as recommended in the guideline
- At least 50% tumor in each of the affected punch biopsy specimens

The AS protocol comprises close monitoring. PSA testing and digital rectal examination are recommended every 3 months for the first 2 years, then at 6-month intervals. Moreover, mpMRI and control biopsy (with mpMRI guidance if needed) are recommended, ideally prior to initiation of AS (2). If the initial diagnostics did not include mpMRI, MRI and control biopsy should take place after 6 months; otherwise, not until 12 months (recommendation strength B1, evidence level 4). Should monitoring reveal progression of the PCa (e.g., demonstration of aggressive tumor elements on control biopsy or a PSA doubling time of < 3 years), the guideline advises terminating the AS protocol and switching to active local treatment with curative intent (recommendation strength A, evidence level 4). If the parameters remain stable, control biopsy can take place every 12–18 months for the first 3 years and at 3-year intervals thereafter (2). Should the patient so wish, AS can be discontinued at any time in favor of definitive curative treatment.

The cancer-specific 10-year survival rate is 98.8–100% (12, 13). As for quality of life, the ProtecT study found no differences between active monitoring (regular PSA testing but no fixed biopsy schedule) and active treatment (13). Overall, it is assumed that more than half of AS patients come to require local treatment at some time in the first 10 years after diagnosis (13, 14), but the remainder may benefit from the potential avoidance of adverse effects.

The American guidelines broaden the inclusion criteria for AS to take in tumors with a Gleason score of 3 or 4 (Gleason grade group II, favorable intermediate risk) (3, 15). The European guidelines also state that inclusion of such patients may be considered, provided the proportion of Gleason pattern 4 is < 10%. Furthermore, the patients should be advised of the elevated risk of metastasis (5). However, the German guideline currently recommends this only in the context of prospective studies, due to the lack of long-term data (2).

Watchful waiting

Watchful waiting is a palliative treatment concept and thus differs distinctly from the AS protocol with its curative intent. Watchful waiting is an option for patients with asymptomatic localized PCa and a life expectancy of less than 10 years (recommendation strength A, evidence level 3). There is no regular observation protocol, and secondary treatment in the form of hormone therapy is initiated only in the event of existing or newly occurring symptoms (e.g., micturition problems or bone pain).

Radical prostatectomy

RP entails surgical removal of the prostate together with the prostatic urethra and the attached seminal vesicles. Additional pelvic lymphadenectomy is carried out if indicated by the tumor stage. This is beneficial for diagnostic purposes, but a therapeutic effect has not yet been demonstrated unequivocally (16, 17). However, lymphadenectomy is associated with an elevated rate of complications (e.g., lymphocele or lymphedema: up to 17.6%) (17).

At surgery, the aim is to achieve tumor-free resection margins (R0 resection), because a positive margin of excision (R1) is associated with an elevated likelihood of recurrence (18). Positive resection margins may occur due to the anatomical proximity of the prostate to the neurovascular bundle responsible for the penile erection, particularly if nerve preservation is intended; therefore, the risk of R1 resection must be weighed up before performing virility-preserving RP. The likelihood of extracapsular extension is high in ≥ cT2c tumors and in tumors with a biopsy Gleason score ≥ 8 (Gleason grade groups IV and V). In these cases nerve preservation can be attempted with the aid of intraoperative analysis of frozen sections (5).

Surgery can be performed using various access routes. Open surgery is often carried out via retropubic access. As for minimally invasive surgery, laparoscopic and robot-assisted laparoscopic

Active surveillance

AS is a treatment option for low-risk localized prostate cancer. At the time of commencement of AS, or at the latest 6 months thereafter, multiparametric magnetic resonance imaging of the prostate should be performed.

Radical prostatectomy

RP is a treatment option for all risk groups of localized PCa. It can be performed as open surgery or in the form of a minimally invasive procedure. Stress incontinence ensues in around 5–15%, erectile dysfunction in 30–80% of cases.

TABLE 2

Overview of randomized studies on treatment options for localized prostate cancer

Study	Study design	Endpoints/effects	Effects	NNT
SPCG-4 study (Sweden): initial publication 2002, most recent update 2018 with 29 years' FU (26, e13)	RP vs WW, n = 348 vs 347 (1989–1999), predominantly intermediate- and high-risk patients	– Overall mortality – PCa-specific mortality – Metastasis rate	Incidence after 23 years:*1 71.9 vs 83.8% 19.6 vs 31.3% 26.6 vs 43.4%	 8.4 8.6 6.0
Pivot study (USA): initial publication 2012, most recent update 2017 with 19.5 years' FU (e14, e15)	RP vs observation, n= 364 vs 367 (1994–2002), all risk groups	– Overall mortality – PCa-specific mortality	Incidence after 19.5 years:*2 61.3 vs 66.8% 7.4 vs 11.4%	–
ProtecT study (UK): initial publication 2016 with 10 years' FU (13)	AM vs RP vs RT, n= 545 vs 553 vs 545 (1999–2009), predominantly low-risk, small number of intermediate-risk patients	– PCa-specific mortality after 10 years – Progression (incidence per 1000 person-years) – Metastases (incidence per 1000 person-years) – Overall mortality (incidence per 1000 person-years)	1.2 vs 1.0 vs 0.4%*2 22.9 vs 8.9 vs 9.0 *1 6.3 vs 2.4 vs 3.0 *1 10.9 vs 10.1 vs 10.3 *2	–

*1 Statistically significant difference
*2 Difference not statistically significant
AM, Active monitoring (regular PSA testing, but without a fixed biopsy schedule; in the event of abnormal findings, referral for treatment with curative intent); FU, Follow-up; NNT, number needed to treat (to attain the endpoint concerned); PCa, prostate cancer; RP, radical prostatectomy; RT, radiotherapy; WW, watchful waiting (palliative concept with no regular follow-up, just symptom-oriented treatment)

approaches are available. In Germany, RP is most frequently performed as an open retropubic or robotic (DaVinci) procedure. No advantages of one technique over the other and no differences between them have been demonstrated to date. In particular, the oncological and functional outcome depends on the experience of the surgeon and the center, not on the access route selected (19–22). The only constant difference is lower blood loss with minimally invasive than with open surgery (23), but the robotic procedure is associated with higher costs.

Alongside the general complications of surgery such as blood loss (median 200–700 mL), infection (incidence < 5%), and thromboembolic events (incidence 0–8.3%), patients must be advised of the risks of stress incontinence (regular use of at least one pad) and erectile dysfunction (2, 21, 23). Stress incontinence can be anticipated in around 5 to 15% of cases, erectile dysfunction in 30 to 80%—depending in each case on patient age, extent of nerve preservation, and previous sexual function (2, 20, 21, 24).

A Swedish randomized prospective study (SPCG-4) with an accumulated 29 years of follow-up has shown that the risk of progression, the risk of metastasis, and the cancer-specific mortality of localized PCa are significantly lower after RP than with watchful waiting (25, 26). Patients under 75 years of age with PSA not exceeding 50 ng/mL, most of them with a palpable tumor (only 12% T1c, i.e., predominantly intermediate- and high-risk patients), were recruited to this study between 1989 and 1999. Patients who underwent surgery lived a mean 2.9 years longer than those in the watchful waiting group *(Table 2)*. Although the study involved no division according to degree of risk, this means that RP is a primary treatment option for localized PCa in all risk groups (evidence level 1+). The goal of RP is lasting cure, ideally with preservation of urinary continence and erectile function (2). Regardless of tumor stage, cancer-specific long-term (10-year) survival rates of 85 to 99% can be expected (13, 27–29).

Follow-up after RP comprises regular PSA testing (recommendation strength A, evidence level 4): initially every 3 months, from 2 years onward every 6 months, and after 5 years annually. Because RP involves complete extirpation of the PSA-producing cells, the postoperative level of PSA should be non-detectable and thus simple to interpret. Following RP, any detectable level of PSA must be taken as a sign of recurrence. The 10-year

Operation techniques

Surgery can be performed using various access routes. In Germany, RP is most frequently performed as an open retropubic or robotic (DaVinci) procedure.

Complications/patient information

Alongside the general complications of surgery such as blood loss, infection, and thromboembolic events, patients must be advised of the risks of stress incontinence (regular use of at least one pad) and erectile dysfunction.

rate of such biochemical recurrences (BCR) is 10 to 15% and 10-year cancer-specific survival is 98% (28). In patients whose tumors extend into adjacent tissues, BCR occur within 10 years of RP in about 50% of cases without (pT3a) and around 70% of cases with infiltration of seminal vesicles (pT3b) (28). However, due to the long natural history of PCa and good options for secondary treatment, even in these advanced stages of PCa, the 10-year survival rates are 96% and 85% respectively (13, 27, 28).

In case of advanced pathology (T3) following RP with positive resection margin (R1 resection) and high Gleason score (7b–10), the risk of biochemical progression is as high as 65 to 80% within 10 years of surgery, even in cases of postoperatively non-detectable PSA (30). Three randomized studies found that adjuvant radiotherapy (RT) of the prostate bed achieved at least a significant reduction of around 38 to 44% in the rate of biochemical progression after 10 years (recommendation strength A, evidence level 1+) (30–34). Recent results from three other randomized studies comparing adjuvant with early salvage RT (RT only in case of biochemical recurrence) demonstrate that adjuvant RT is often unnecessary (e1–e4). This is currently not the case, however, for patients in the above-mentioned high-risk categories, in whom adjuvant RT is still indicated.

Percutaneous radiotherapy

The standard technique for percutaneous RT of PCa is intensity-modulated RT (IMRT) (recommendation strength A, evidence level 2). Compared with the earlier 3D-planned RT, the far steeper dose reduction with IMRT enables much better sparing of the at-risk organs rectum and urinary bladder (35). IMRT has to be deployed together with image-guided RT (IGRT) in order to ensure correct positioning and thus precision in delivery of the irradiation (2). In comparison with the previous standard dose of 70 Gy, IMRT of localized PCa lowers the risk of severe late complications by administering total doses of 74 to 80 Gy in individual doses of 2 Gy (recommendation strength A, evidence level 1++).

The randomized prospective phase-III ProtecT study demonstrated identical cancer-specific 10-year survival of about 99% in 1643 patients with low or intermediate risk profiles who were treated with RP, RT, or active monitoring (regular PSA testing, but no fixed biopsy schedule). Overall survival also did not differ among the three groups. With regard to metastasis-free survival, however, RP and RT were significantly superior to active monitoring (13). RT is therfore a primary treatment option for localized PCa of all risk groups (evidence level 1+ for low/intermediate risk, evidence level 2+ for high risk) (2).

In recent years hypofractionated RT has also come to be used routinely. In "moderate" hypofractionation (2.5 to 4 Gy/day) the individual doses are higher but a lower total dose is given. The oncological results are relatively good—despite elevated acute toxicity—but at 5 years the median follow-up duration of the numerous randomized studies is not sufficient for conclusive assessment of bladder toxicity (evidence level 1+) (2, 36–38). The advantage for patients is the approximate halving of the time needed for treatment. One randomized study has published preliminary results of "ultrahypofractionation" (individual doses > 4 Gy): seven treatment fractions at 3× per week (total dose 42 Gy) yielded comparable oncological results and late complications, but acute reactions occurred significantly more often (39). No conclusive assessment of ultrahypofractionated RT can yet be made, but it will probably become routine.

RT of intermediate- and high-risk tumors should be accompanied by administration of antihormonal treatment, usually in the form of a GnRH analog (recommendation strength A, evidence level 1+). Accompanying short-term hormone therapy (4–6 months) for patients with an intermediate risk profile and long-term hormone therapy for patients with a high risk profile have been demonstrated to prolong life significantly compared with RT alone (increase in clinically recurrence-free 5-year survival from 40% to 74%), so hormone therapy represents standard treatment (2, 32, e5).

Patients must be informed about the possible acute and late complications of percutaneous RT: while severe late urogenital complications (RTOG grade III and IV) can be anticipated in around 3–5% of cases, severe late bowel complications have become rare since the advent of IMRT (2, 35). Irritative voiding disorders are typical adverse effects of percutaneous irradiation. RT alone may also cause erectile dysfunction in 20–77% of cases with several years' latency (2). Ionizing radiation can also cause malignancies (e.g., cancer of the bladder or rectum). The risk of a second malignancy within 10 years is around 1% (e6). Furthermore, patients must be informed about the adverse effects of antihormonal treatment.

Follow-up after RP

Follow-up after RP comprises regular PSA testing (recommendation strength A, evidence level 4): initially every 3 months, from 2 years every 6 months, and after 5 years annually.

Percutaneous radiotherapy

The standard technique for percutaneous RT of PCa is intensity-modulated RT. Compared with the earlier 3D-planned RT, the far steeper dose reduction with IMRT enables much better sparing of the at-risk organs rectum and urinary bladder.

Apart from ultrahard radiation (photons), RT with protons can also be given. This considerably more complex form of treatment is associated with much higher costs. No proof of oncological superiority or any significant reduction in the rate of acute or late complications has been forthcoming. The German clinical practice guideline states that RT with protons offers no clinical benefit compared with photons (evidence level 2+) (2).

Brachytherapy

Low dose rate (LDR) brachytherapy

In interstitial LDR-BT, iodine-125 seeds (prescribed dose: 145 Gy) are implanted into the prostate via the transperineal route with transrectal sonographic guidance. These seeds deliver the dose gradually over a period of several months and stay in place for the duration of the patient's life. LDR-BT is an option for primary treatment of low-risk (evidence level 2+) and, with limitations, intermediate-risk localized PCa (2). Retrospective comparison with percutaneous irradiation shows comparable BCR rates after 8 years in low-risk tumors (e7, e8). The rate of rectal complications is somewhat lower than with percutaneous RT, but that of urethral complications is higher (e9, e10). In about 20% of cases, implantation is followed by urinary retention requiring catheterization, so it may be helpful to ensure that patients planned for this treatment have good parameters of micturition (International Prostate Symptom Score < 12/35 points, urinary flow rate > 15 mL/s) and a prostate < 60 cm^3 in volume (2). Preceding transurethral resection of the prostate is considered a risk factor for an elevated rate of postinterventional incontinence.

A randomized phase-III study of 398 patients with PCA, predominantly categorized as high risk, compared LDR-BT with percutaneous RT, each accompanied by 12 months' androgen deprivation therapy (ADT). With regard to freedom from biochemical progression after 7 years, the combination of LDR-BT with ADT was significantly superior (86% versus 75%). However, the rate of severe (grade III) urogenital complications was significantly higher (20.5% versus 5.8%) (e9, e11). The incidence of erectile dysfunction after 5–7 years was comparable for LDR-BT and percutaneous RT. Overall, with the exception of the study just mentioned, data that would permit conclusive assessment of LDR-BT in comparison with RP and percutaneous RT are lacking.

High dose rate (HDR) brachytherapy

In HDR-BT, temporary needles are inserted into the prostate under spinal or general anesthesia. The radioactive source (Iridium-196) is then placed through the needles into the prostate in an afterloading technique. In contrast to LDR-BT, the radioactive source as well as the needles are removed again after the procedure. HDR-BT is characterized by a very steep dose drop-off in adjacent tissues, meaning that high individual doses can be given. As a rule HDR-BT is accompanied by percutaneous RT (evidence level 1+ to 3). No large randomized comparative studies have taken place (2). One randomized study compared HDR-BT and percutaneous RT with percutaneous RT alone, but the total dose was too small (e12). Furthermore, there are numerous retrospective comparative studies that demonstrate the value of HDR-BT as a primary treatment option in the intermediate- and high-risk groups (2). The spectrum of adverse effects resembles that for percutaneous RT. Due to the lack of long-term prospective randomized studies comparing percutaneous RT with HDR-BT, however, no conclusion can be drawn as to superiority or inferiority. Brachytherapy of any kind should be carried out at an experienced center (2).

Experimental treatment options

Improvements in imaging in recent years have permitted the increasing development of focal treatment. Advantage is taken of various physical mechanisms—heat (e.g., in focussed ultrasound), cold (e.g., in cryoablation), light (e.g., with padeliporfin)—to achieve targeted destruction of the cancer foci in the prostate with minimal adverse effects.

Because of the limited nature of the data available, focal treatments should be considered only in patients with low- or low/intermediate-risk cancers and only after informing them of the lack of long-term results (recommendation strength A). Deployment of focal treatments should be restricted exclusively to clinical trials. Regular follow-up (preferably in the form of an active monitoring protocol) is necessary after all treatments.

Conflict of interest statement

Prof. Schlemmer has received funding for a project of his own initiation from Profound Medical Inc (Canada).

Prof. Wiegel has received lecture fees from Ipsen.

Dr. Knipper, Dr. Ott, Prof. Grimm, and Prof. Graefen declare that no conflict of interest exists.

Low dose rate brachytherapy

LDR brachytherapy is a treatment option for low-risk localized PCa. Good parameters of micturition are a precondition for LDR brachytherapy.

High dose rate brachytherapy

HDR brachytherapy is a treatment option for patients in the intermediate- and high-risk groups.

Manuscript received on 2 April 2020, revised version accepted on 16 September 2020

Translated from the original German by David Roseveare

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Experimental forms of treatment

Because of the limited nature of the data available, experimental forms of treatment should be considered only in patients with low- or low/intermediate-risk PCa and only after informing them of the lack of long-term results. Deployment of such treatments should be restricted to clinical trials.

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Cite this as:
Knipper S, Ott S, Schlemmer H-P, Grimm M-O, Graefen M, Wiegel T: Options for curative treatment of localized prostate cancer. Dtsch Arztebl Int 2021; 118: 228–36. DOI: 10.3238/arztebl.m2021.0026

► **Supplementary material**

eReferences:
www.aerzteblatt-international.de/m2021.0026

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Only one answer per question is possible. Please select the answer that is most appropriate.

Question 1
How is localized prostate cancer defined in terms of tumor stage?
a) T1–2 N0 M0
b) T1–2 N0–1 M0
c) T1–3 N0 M0
d) T1–4 N0 M0
e) T2–4 N0 M0

Question 2
The D'Amico risk classification divides localized prostate cancer into risk groups with regard to the likelihood of biochemical recurrence and prostate cancer-specific mortality. How is the low-risk group defined?
a) PSA ≤ 10 ng/mL and Gleason score 6 and cT category 1c, 2a
b) PSA ≤ 10 ng/mL or Gleason score 7 or cT category 1c, 2a
c) PSA > 10 ≤ 20 ng/mL or Gleason score 7 or cT category 2b
d) PSA > 10 ≤ 20 ng/mL or Gleason score 8 or cT category 2b
e) PSA > 20 ng/mL or Gleason score 8 or cT category 2c

Question 3
Which of the following life expectancies is considered the minimum if treatment of localized prostate cancer is to have a life-prolonging effect?
a) 15 years
b) 12 years
c) 10 years
d) 3 years
e) 1 year

Question 4
A 68-year-old man in your care is diagnosed with non-palpable (cT1c) prostate cancer on the basis of a PSA level of 7.5 ng/mL. According to the German clinical practice guideline, which of the following is a precondition for active surveillance?
a) Gleason score 6 tumor in ≤ 4 biopsy cores with ≤ 30% tumor tissue
b) Gleason score 6 tumor in ≤ 2 biopsy cores with ≤ 50% tumor tissue
c) Gleason score 7 tumor in ≤ 4 biopsy cores with ≤ 50% tumor tissue
d) Gleason score 7 tumor in ≤ 2 biopsy coress with ≤ 50% tumor tissue
e) Gleason score 8 tumor in ≤ 2 biopsy cores with ≤ 50% tumor tissue

Question 5
The 68-year-old patient has decided in favor of active surveillance. Apart from the transrectal ultrasound at punch biopsy, no imaging was included in the initial diagnostics. Which of the following imaging procedures are now recommended during the follow-up?
a) Chest radiography and abdominal CT after 6 months to exclude metastasis
b) Chest radiography and abdominal CT after 12 months to exclude metastasis
c) MRI of the prostate and control biopsy of the prostate after 6 months
d) MRI of the prostate and control biopsy of the prostate after 24 months
e) No imaging is recommended.

Question 6
On two occasions an otherwise healthy 65-year-old man in your care has needed an indwelling catheter due to pronounced symptoms of obstructed micturition. He refuses external radiation. High-risk prostate cancer is diagnosed. What is now the most advisable option for treatment?
a) Active surveillance
b) LDR brachytherapy
c) HDR brachytherapy
d) Radical prostatectomy
e) HIFU with hormone therapy

Question 7
An otherwise healthy 65-year-old man in your care has no voiding problems but is diagnosed with localized prostate cancer on the basis of a PSA level of 22 ng/mL. He refuses surgery. What is now the most advisable option for treatment?
a) Active surveillance
b) Watchful waiting
c) LDR brachytherapy
d) Percutaneous radiotherapy with long-term hormone therapy
e) HIFU with hormone therapy

Question 8
In what proportion of cases must stress incontinence be anticipated after radical prostatectomy?
a) Around 0–5%
b) Around 5–15%
c) Around 20–25%
d) Around 30–35%
e) Around 40–45%

Question 9
Which of the following is a typical complication of percutaneous radiotherapy?
a) Lymphocele
b) Irritative voiding symptoms
c) Stress incontinence
d) Premature ejaculation
e) Stool incontinence

Question 10
How should focal treatments be used?
a) As part of a watchful waiting strategy
b) In patients over 85 years old
c) After percutaneous radiotherapy
d) Together with radical prostatectomy and external radiation
e) Only in clinical studies

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Supplementary material to:

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by Sophie Knipper, Saskia Ott, Heinz-Peter Schlemmer, Marc-Oliver Grimm, Markus Graefen, and Thomas Wiegel

Dtsch Arztebl Int 2021; 118: 228–36. DOI: 10.3238/arztebl.m2021.0026

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