Prostate Cancer in Elderly Men

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Due to increasing life expectancy and the introduction of prostate-specific antigen (PSA) screening, a rising number of elderly men are diagnosed with prostate cancer. Besides PSA serum levels and Gleason score, age is considered to be a key prognostic factor in terms of treatment decisions. In men older than 70 years, treatment without curative intent may deprive the frail patient of years of life. Modern radical prostatectomy techniques are associated with low perioperative morbidity, excellent clinical outcome, and documented long-term disease control. Thus, radical prostatectomy should be considered because local treatment of organ-confined prostate cancer potentially cures disease. The huge extent of PSA screening programs may lead to overdiagnosis of prostate cancer. Not every man who is diagnosed with prostate cancer will develop clinically significant disease. This has led to the concept of expectant management for screen-detected, small-volume, low-grade disease, with the intention of providing therapy for those men with disease progression.
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Prostate cancer is the most common malignancy among elderly men and is the second leading malignancy in the Western world.[1] The incidence of prostate cancer has steadily increased over the last decade.[1,2] Between 2000 and 2050, the number of men over 65 years is expected to increase 4-fold worldwide. By 2030, the percentage of men older than 65 years will rise to 19.6% of the population compared with 12.4% population in 2000.[1,2] Thus, the percentage of men who will be diagnosed with prostate cancer and those who will require treatment for their malignancy will rise in the coming years.

A rising incidence of microscopic foci of prostate cancer is found in men with increasing age. Results of autopsy studies have shown that almost 30% of men over the age of 50 have histological evidence of prostate cancer.[3]

More and more prostate cancers are also diagnosed in younger men who want treatment that does not compromise their quality of life, take time away from work, or cause worrisome side effects. Laparoscopic radical prostatectomy, robot-assisted laparoscopic radical prostatectomy, and third-generation cryotherapy are promising new treatment options for men diagnosed with prostate cancer.[4]

Although a majority of prostate cancer patients will develop microscopic disease with increasing age, only a few of these patients will experience invasive prostate cancer. Due to its indolent course and the fact that the majority of patients are diagnosed early, disease progression often occurs many years after the initial diagnosis. Elderly men who have concurrent severe comorbidities may not experience progression to metastatic stage during their lifetimes. Androgen deprivation therapy is effective for treating prostate cancer, but patients can often experience significant side effects. These complications need to be recognized and managed properly in order to minimize adverse effects and loss of patients' quality of life. To choose the right treatment option, clinicians need to determine whether patients are at high or low risk for disease progression and invasive forms of prostate cancer.

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Age as a Risk Factor

The incidence of deaths from prostate cancer has decreased over the last decade, probably as a result of improved screening and diagnosis, improved treatments, and better risk assessment to guide therapy. Moderate incidence increases in the last decade are most likely attributable to widespread PSA screening among men younger than 65 years. Prostate cancer incidence rates have leveled off in men aged 65 years and older. Rates peaked in white men in 1992 (237.6 per 100,000 men) and in African American men in 1993 (342.8 per 100,000 men).[5]

A study by the Defense Center for Prostate Disease Research indicated that the percentage of men older than 65 years diagnosed with prostate cancer decreased from 53% in 1990 to 27.8% in 1996 and remained stable thereafter. The number of patients diagnosed with prostate cancer who are younger than 60 years old increased from 18.6% in 1991 to 40.7% in 2000.[6] From the pre-PSA era (1980-1985) until the PSA-era (1990-1995), the median age of men diagnosed with prostatic cancer in the United States decreased by 1 year, and the median age at death increased by 1 year.[6]

The probability of developing prostate cancer increases from 0.005% in men younger than 39 years to 2.2% in men between 40 and 59 years and 13.7% in men between 60 and 79 years.[5-7] The current lifetime risk of developing prostate cancer is 16.7% (1 in 6 men). The probability of developing histological evidence of prostate cancer is even higher. Carter and colleagues[8] showed that 50% of men between 70 and 80 years of age showed histological evidence of malignancy. A lifetime risk of 42% for developing histological evidence of prostate cancer in 50-year-old men has been calculated.[8,9] In men at this age, however, the risk of developing clinically significant disease is only 9.5%, and the risk of dying from prostate cancer is only 2.9%.[9]

Impact of Age on Treatment

The rising number of men diagnosed with prostate cancer is a result of increasing life expectancy as well as the current practice of screening by prostate-specific antigen (PSA) blood tests.[10] Besides PSA and Gleason score, age is considered a key prognostic factor in treatment decision making. Although organ-confined disease can be cured by radical prostatectomy and full-dose local radiation therapy, treatment options for advanced-stage disease remain palliative. They include active surveillance, or watchful waiting, early versus delayed hormonal therapy to control disease progression, and continuous or intermittent androgen deprivation. Observational studies of older men with early stage disease have suggested conservative management as a viable option.[11,12]

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A study by Albertsen and colleagues[13] investigated long-term outcomes of 767 men diagnosed with localized prostate cancer between 1971 and 1984. The aim of the study was to estimate survival based on a competing risk analysis. Men between 55 and

74 years of age were treated with either immediate or delayed hormonal therapy and followed for 10 to 20 years after diagnosis. This study demonstrated that men with prostate biopsy specimens showing Gleason score 2 to 4 disease faced a minimal risk of death from prostate cancer within 15 years from diagnosis. Most elderly men showing Gleason grade 2 to 4 died from competing medical hazards other than prostate cancer during the observation time. In the group of patients between 70 and 74 years of age, only 7% and 11% of those with Gleason scores of 2 to 4 and 5, respectively, died of prostate cancer. In contrast, men with Gleason scores 7 to 10 faced a higher risk of dying from prostate cancer when treated conservatively, even at the age of 75 years. Men with Gleason scores 5 to 6 faced a moderate risk of death from prostate cancer that increased slowly over at least 15 years of follow-up. Meanwhile 32%, 40%, and 60% of patients aged 70 to 74 years with biopsy Gleason scores of 6, 7, and 8 to 10, respectively, died of prostate cancer. Men with Gleason scores higher than 7 experienced high death rates due to prostate cancer, regardless of their age at diagnosis. During the observation time, most of these men died from prostate cancer; approximately one third of the older men died from competing medical hazards. The 20-year follow-up analysis of this cohort published by Albertsen and coworkers[14] clearly demonstrated that men with low-grade prostate cancer are at low risk for disease progression even after 20 years of watchful waiting or androgen deprivation therapy. Men with Gleason 7 and 8 to 10 tumors were found to be at high risk of dying from prostate cancer. After 20 years, only 3 of 217 patients survived. Men with moderate-grade disease have intermediate cumulative risk of prostate cancer progression after 20 years of follow-up.

These results are in line with earlier findings on the outcomes of prostate cancer patients depending on Gleason scores. Johansson and colleagues[10] in 1997 published a 15-year follow-up analysis of a cohort of 642 prostate cancer patients who received no immediate therapy when diagnosed. Only 300 patients had organ-confined prostate cancer. Eighty-five of patients were younger than 70 years. Fifty percent showed well-differentiated tumors. Although its power is limited by the small number of evaluated patients with moderate-grade or high-grade tumors, this study demonstrated that Gleason score correlates with risk of death from prostate cancer. Thus, 6% of the patients with well-differentiated disease, 17% with moderately differentiated disease, and 56% with poorly differentiated disease died from prostate cancer.

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Chodak and associates[12] evaluated 828 men who were managed expectantly in a series of nonrandomized trials. Median follow-up was approximately 6.5 years. Patients with poorly differentiated cancers had a 10-fold increased risk of death from prostate cancer as compared with men showing highly differentiated prostate cancer. A 5-year disease-specific survival of only 34% was found in men with poorly differentiated prostate cancer. In contrast a 5-year disease-specific survival of 87% was described in men with well- or moderately differentiated cancers.

Considering these findings it is reasonable to withhold active therapy in elderly patients with well- or intermediately differentiated prostate cancers, thus avoiding the associated risks and impact on quality of life.

How to Make the Right Treatment Decision

Current expert guidelines for treatment of localized prostate carcinoma recommend potentially curative therapy for patients whose life expectancy is at least 10 years.[12,14] Patients with limited life expectancy are more likely to die from health conditions other than prostate cancer. Men with a life expectancy of more than 10 years are more likely to die from progressive prostate cancer.[14] This 10-year rule enjoys broad acceptance among urologists and radiation oncologists.[15,16]

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Conservative management proved to be an acceptable treatment option for men with low-grade Gleason

scores, clinically localized disease, and life expectancies of less than 10 years. Increasing age was described as a risk factor for receiving inadequate treatment for prostate cancer.[17] Thus, older men have been shown to receive potentially curative therapy (radical prostatectomy or radiotherapy) less often than younger men.[18,19] Radical prostatectomy is preferred treatment in men younger than 70 years, whereas radiation therapy is applied predominantly in patients older than 70 years. Conservative therapy such as watchful waiting or androgen deprivation by luteinizing hormone-releasing hormone analogs is preferentially applied in men older than 80 years. Watchful waiting or hormonal therapy is used to treat 82% of men older than 80 years.

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Age, clinical stage, PSA level, histological grade, and comorbidities should be carefully balanced before making a treatment decision, especially in elderly men suffering from prostate cancer.[19-21] In order to choose the appropriate option, patients should be selected for potentially curative treatment on the basis of age, remaining life expectancy, tumor grade, and comorbidity.

Harlan and colleagues[22] investigated the association of sociodemographic and clinical characteristics in 3073 men with clinically localized prostate cancer treated with radical prostatectomy, radiation therapy, hormonal therapy, and watchful waiting. Among other parameters such as pretreatment PSA, clinical stage, or Gleason score, patient age at diagnosis was an important determinant of therapy. Seventy-nine percent of men younger than 60 years at diagnosis were treated by radical prostatectomy. The percentage of men receiving hormonal therapy or watchful waiting increased substantially with age. Fifty-eight percent of the men between 75 and 79 years and 82% of men older than 80 years received hormonal therapy or watchful waiting. Outcomes among men treated by radical prostatectomy and radiation therapy were examined. After adjustment for clinically significant characteristics such as PSA serum levels and comorbidity, age was positively correlated with treatment by radiation therapy. Only 13.9% of men younger than 60 years were treated by radiation therapy compared with 70.5% of men older than 75 years.

Various studies have demonstrated that potentially curative therapy of men with prostate cancer is applied less often in older men and men with significant comorbidity.[23] In contrast, 2 other studies failed to demonstrate any impact of comorbidity on treatment decisions.[24,25] None of these studies was able to determine whether age and comorbidity of patients were properly considered in treatment decisions. Potentially curative therapy should be offered to those patients with the greatest potential to benefit.

Watchful Waiting and Active Surveillance

Watchful waiting is an adequate approach in patients who are at low risk of death from prostate cancer because of their limited life expectancy due to severe comorbidities.[26,27] Watchful waiting resulted in similar overall survival when compared with radical prostatectomy, but disease-specific survival was better in patients who had undergone surgery.[26] For some patients it turns out to be hard to persist on a watchful waiting policy, and many men drop out and seek active treatment within several years, mostly when PSA elevation is noted.

Active surveillance is a novel and fascinating approach to distinguish between patients who are at higher risk and need active therapy and patients who are at low risk for disease progression.[27,28] This approach avoids the risks of therapy while allowing early detection of those patients who are prone to progress. In these high-risk individuals, delayed active treatment is offered. Periodic monitoring of the PSA serum level, digital rectal exam, and repeated prostate biopsies are performed in patients who are on active surveillance, and active therapy is started when predefined threshold values are reached. This concept makes it possible to offer curative treatment to individuals who are at high risk for disease progression as indicated by active surveillance parameters.

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Does Overdiagnosis Lead to Overtreatment of Older Men?

The widespread use of PSA screening has led to an increase in the diagnosis and treatment of early localized prostate cancer. Data from the US Cancer of the Prostate Strategic

Urological Research Endeavor database suggest a significant decrease in risk in the last 2 decades in the United States, with more patients being identified with low-risk disease at diagnosis,[29] but the role of active treatment of low- and intermediate-risk disease in elderly men remains controversial.

The median time from diagnosis to death from prostate cancer for men with nonpalpable disease is approximately 17 years.[30,31] Considering that the US male life expectancy at the age of 65 years is 16 years, aggressive therapy will hardly extend life expectancy of older men with no palpable prostate cancer at the time of diagnosis.[32] Twenty to 30% of prostate cancers detected by PSA screening programs show Gleason scores of 6 or lower and, thus, are not poorly differentiated and have volumes smaller than 0.5 cm^3.[33-35]

Histologic evaluation of radical prostatectomy specimens demonstrated that about 20% to 30% of cancers are small volume, show low Gleason scores, and are consequently clinically harmless.[35,36] Many of these cancers pose little threat to life, especially for older men. Has PSA screening resulted in prostate cancer overdiagnosis?

Computer modeling of screen-detected populations at the age of 65 years undergoing radical prostatectomy have shown that surgery may extend life expectancy for 9 to 20 months when averaged out over an entire population.[37,38] This benefit is comparable to other treatment strategies, including cardiac revascularization. Nonetheless, overdiagnosis does occur and can be considered a side effect of mass screening programs. A study by Carter and associates[39] demonstrated that 65-year-old men with low PSA serum levels are at low risk for developing prostate cancer, and it is unlikely that they will be diagnosed with prostate cancer during the next decade. This study suggests that less intensive PSA screening could maintain the detection of the majority of prostate cancers in men up to the age of 75 years and markedly reduce unnecessary PSA testing for men with low PSA serum levels. This reduction of PSA testing in older men who are at low risk could result in fewer unnecessary prostate biopsies and lead to a more cost-effective management.

Prostate-specific antigen velocity has been found to be a valuable tool to more accurately assess high-risk patients for prostate cancer progression. Berger and coworkers[40] investigated the impact of tumor and prostate volumes on prostate-specific antigen velocity (PSAV) to find predictors of biochemical failure after radical prostatectomy. This study showed that the main factor contributing to PSAV in patients with prostate cancer is cancer load and that prostate volume is not significantly associated with PSAV. Men with a PSAV of more than 2 ng/mL/year in the year before diagnosis are at a high risk for relapse. PSAV may be helpful in identifying patients with small tumors and increasing the detection rate of potentially curable prostate cancers.

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Similar results have been published by D'Amico and colleagues.[41] They investigated men diagnosed with clinically localized prostate cancer who are at high risk for death from prostate cancer. Despite PSA levels less than 10 ng/mL and Gleason scores of 6, a PSA increase of more than 2 ng/mL during the year before diagnosis was found to place a man at high risk for prostate cancer death following radical prostatectomy or external beam radiation therapy.

A recent study demonstrated the role of other molecular markers such as Bcl-2 expression as predictors of hormone-refractory prostate cancer.[42] Determination of Bcl-2 expression in addition to PSA measurement before treatment could identify hormone-resistant patients who may benefit from additional treatment such as chemotherapy.

Are Older Men Undertreated?

Alibhai and colleagues[43] generated an age-stratified random sample of 347 men from a cohort of patients with newly diagnosed prostate carcinoma in the Ontario Cancer Registry. Patients who were younger than 60 years were more likely to receive radical prostatectomy than radiation therapy or no therapy. Men between 60 and 69 years of age were more likely to receive radiation therapy than radical prostatectomy. Men between 70 and 79 years were most likely to receive no therapy, and nearly all men over 80 years received no therapy. The decreased likelihood of receiving curative therapy correlated with patient age, Charlson index score, tumor stage, and the urologist's year of graduation. Analysis of remaining life expectancy and treatment demonstrated that men with a higher life expectancy in general received potentially curative therapy more frequently compared with others with short life expectancies. It is interesting to consider that despite similar remaining life expectancies, older men were less likely to receive potentially curative therapy than younger men. For men with life expectancies of at least 10 years, 73% of men younger than 60 years of age and 68% of men older than 60 years received

potentially curative therapy. Only 40% of men older than 70 years received curative therapy. The distribution was even more pronounced among patients treated by radical prostatectomy. Surgery was performed in 65% of patients younger than 60 years and in 40% of patients between 60 and 70 years. No patient older than 80 years received radical prostatectomy.[41] Even after adjusting for life expectancy and other predictive variables, high age was associated with low likelihood of receiving curative treatment such as radical prostatectomy or radiation therapy.

Schwartz and colleagues[44] reviewed the treatment decisions and factors influencing them in a cohort of men with localized prostate cancer. Age, comorbidity, and Gleason score were found to be independent predictors of suboptimal treatment. It was concluded that most men older than 70 years with moderately or poorly differentiated tumors and no to mild comorbidity were given suboptimal treatment. Most of these men were undertreated, receiving watchful waiting therapy when potentially curative therapy could have been applied. With optimal treatment, clinical outcomes could have been improved.

Dahm and associates[45] estimated the long-term probability of death from prostate cancer and other competing diseases. They investigated 484 patients older than 70 years who underwent radical perineal surgery for organ-confined prostate cancer between 1970 and 2000. Men treated with radical prostatectomy had a significantly lower risk of death from prostate cancer compared with patients in the watchful waiting group. It also turned out that patients with life expectancies of 10 years or less whose biopsies showed Gleason score 6 or lower have little biological risk of death from prostate cancer. In the group of patients older than 70 years with Gleason score 7, more patients died of prostate cancer during 10 years of follow-up compared with other causes. The chance of dying from prostate cancer was 40% in patients with Gleason score 8 to 10, but risk of death from other competing causes was even greater. Patients with a given Gleason score and a projected life expectancy of at least 10 years may be at similar risk of dying from prostate cancer as younger patients.

Careful selection of patients even older than 80 years can achieve satisfactory oncologic and functional outcomes after surgery.

Thompson and colleagues[46] investigated otherwise healthy octogenarians diagnosed with prostate cancer who underwent radical prostatectomy. At the last follow-up visit, 10 patients had survived more than a decade after surgery, and 3 patients had died within 10 years of surgery. The remaining 6 patients were alive at less than 10 years of follow-up. Seventy-four percent of patients were continent. No patient had died of prostate cancer, and the 10-year, all-cause survival rate was similar to that observed in healthy patients 60 to 79 years old undergoing radical prostatectomy. These findings indicate that careful selection of patients even older than 80 years can achieve satisfactory oncologic and functional outcomes after surgery. It is important to note, however, that the rate of urinary incontinence after surgery exceeds that of younger counterparts.

Recently the attitude of patients with localized prostate cancer toward aggressive treatment was investigated. Regarding radiation therapy, most patients with localized prostate cancer preferred the lower radiation dose. This indicates that, for most patients, quality-of-life aspects are more important than improving survival.[47] A study that investigated survival associated with treatment versus observation of localized prostate cancer in elderly men was published by Wong and associates.[48] The authors suggest that a survival advantage is associated with active treatment for low- and intermediate-risk prostate cancer in elderly men aged 65 to 80 years.

Because prostate cancer has a detrimental impact on health and life quality, healthy elderly men should be checked routinely by PSA measurements and undergo biopsy when PSA is elevated. No age cutoff has been established for PSA testing, but there is general agreement that men with life expectancies of less than 10 years are unlikely to benefit from early detection because of the long natural history of untreated localized prostate cancer and competing causes of death.[13] Gleason score is a strong predictor for the natural history and prognosis of prostate cancer patients and should be carefully considered when a treatment decision is made. Thus, as discussed, patients with poorly differentiated prostate cancers who are at high risk of death die from their disease even when they are more than 70 years old. Treatment needs to be tailored to the individual life situation. Patients with poorly differentiated prostate cancers with

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Why does age still influence treatment decisions in healthy elderly men with localized prostate carcinoma who could potentially be cured? This could be explained by the attitude of clinicians, who may be reluctant to offer aggressive treatment to older men because of an increased risk of short-term and long-term treatment-related adverse effects.[49-51] Urologists may also apply age thresholds for radical prostatectomy. The 10-year rule discussed above may be interpreted as an age cutoff of 70 years.[52]

The predilection for prostate cancer screening among health-care providers in general declines with increasing patient age but then persists for a small proportion of patients.[53] A more selective screening practice is recommended for men older than 75 years. Age is also a crucial factor in treatment preferences. Older patients may be more inclined to avoid risk and less willing to sacrifice quality of life for prolongation of life. On the other hand, some older men may prefer surgery over conservative treatment even if no survival benefit can be expected because of the psychological impact of cancer and its life-threatening potency.

A study by Stephens and coworkers[54] addressed the quality of life of men with locally advanced prostate cancer during neoadjuvant hormone therapy. Many of the men treated by androgen deprivation therapy reported reduced sexual functioning before treatment, and the additional decline during hormonal treatment seemed to be generally accepted as the price to pay for an appropriate cancer treatment.

Quality of Life With Advanced Stage Prostate Cancer

Since Huggins and Hodges won a Nobel Prize in 1966 for their work describing the relationship between testosterone and prostate cancer, androgen deprivation has continued to be an important component in the treatment of advanced prostate cancer. It is associated, however, with significant cost in terms of morbidity as well as economics. Side effects of androgen deprivation therapy include hot flashes, osteoporosis, loss of libido or impotence, and psychological effects such as depression, memory difficulties, or emotional lability. Recently Harle and colleagues[55] reported insulin resistance, hyperglycemia, metabolic syndrome, and metabolic complications being associated with castration and thus being responsible for increased cardiovascular mortality in this population.

Because of the palliative nature of androgen ablation, quality of life is an important component of evaluating competing therapies. Intermittent androgen deprivation is one approach to hormonal therapy that has been developed with the aim of minimizing the negative effects of therapy while maximizing clinical benefits and the patient's quality of life. It can be used in any clinical situation where continuous androgen deprivation treatment could be applied.[56]

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It has been demonstrated both in preclinical and clinical trials that intermittent androgen suppression may improve quality of life and potentially increase survival. The rationale for intermittent androgen suppression is that there appears to be recovery of apoptosis and subsequent slower progression to an androgen-independent state, thus offering a biological advantage.[57] It is thought that cells surviving androgen withdrawal are forced into alternative pathways of differentiation by androgen replacement and restoration of apoptotic potential may be achievable.

During a follow-up of 46 months, Opfermann and colleagues[58] found that 85% of patients remained responsive to intermittent androgen deprivation therapy. Only 14% experienced disease progression and developed hormone-refractory prostate cancer. Patients with T3 and T4 stage tumors were significantly more likely to develop resistance to androgen deprivation therapy. Klotz and associates[59] reported in a small number of patients and a short follow-up that an intermittent approach to the use of diethylstilbestrol resulted in improved quality of life and no statistically significant deleterious effect on survival. Goldenberg and colleagues[60] treated patients with medical castration and used PSA to decide timing of discontinuing therapy. An improvement of quality of life with no negative effect on survival at early follow-up was noted.

However, most of the studies investigating intermittent androgen deprivation in prostate cancer patients lack prospective, randomized trials comparing intermittent and continuous approaches, and most trials include only a small number of patients and do not have major follow-up. The amount of time for the initial period of castration is still controversial.

Intermittent androgen ablation does not have major negative effects on survival at early time intervals and in general results in less morbidity and potentially improved quality of life, sometimes with recovery of libido and potency, although such

conclusions must await large-scale and prospective studies. Intermittent androgen deprivation appears to be a viable option, especially for older patients with low-grade Gleason score and biochemical failure after local radiation therapy or radical prostatectomy to preserve life quality and prolong responsiveness to androgens.

Conclusions

Optimal management of clinically localized prostate cancer, especially in elderly men, presents a unique challenge. There is an urgent need to predict more accurately its natural history and growth characteristics in order to avoid unnecessary treatment. At present, clinical criteria such as PSA serum levels, DRE, and transrectal ultrasound provide the best way of determining the presence of a small-volume disease. Careful selection and monitoring of older men with small-volume cancers may provide a reasonable alternative to treatment of all screen-detected cancers. New approaches to managing prostate cancer in older men are necessary to decrease health-care costs and morbidity and reduce unnecessary therapy. ■

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Main Points

- Longer life expectancy and widespread use of prostate-specific antigen (PSA) screening are increasing the number of elderly men diagnosed with prostate cancer.
- Not every man who is diagnosed will develop clinically significant disease. Small-volume tumors and low Gleason scores indicate little threat to life, especially for elderly men who have severe comorbidities.
- Expectant management for small-volume, low-grade disease aims to provide therapy for men with disease progression while avoiding the associated risks and impact on quality of life. Compared with radical prostatectomy, watchful waiting results in similar overall survival but lower disease-specific survival among elderly men.
- Expert guidelines for treatment of localized prostate cancer recommend potentially curative therapy for patients with life expectancies of at least 10 years, but older men receive such therapy less often than younger men. Modern radical prostatectomy techniques have low perioperative morbidity, excellent clinical outcome, and documented long-term disease control. Careful selection of patients even older than 80 years can achieve satisfactory outcomes.
- Older patients may be more inclined to avoid risk and less willing to sacrifice quality of life for prolongation of life.
- Androgen deprivation therapy is effective, but significant side effects need to be managed properly in order to minimize loss of quality of life. Intermittent androgen deprivation appears to be a viable option for older patients.
- No age cutoff has been established for PSA testing. Healthy elderly men should be checked routinely by PSA measurements and undergo biopsy when PSA is elevated.

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