

# EAU 2004 Guidelines on Assessment, Therapy and Follow-Up of Men with Lower Urinary Tract Symptoms Suggestive of Benign Prostatic Obstruction (BPH Guidelines)

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## Abstract

**Objective:** To provide the first update of the EAU guidelines on assessment, therapy and follow-up of men with lower urinary tract symptoms (LUTS) suggestive of benign prostatic obstruction (BPO).

**Methods:** A systematic literature review was conducted based on the results of a MEDLINE<sup>®</sup> search concentrating on the years 1999–2003. In combination with expert opinions recommendations were made on the usefulness of diagnostic tests, therapeutic options and follow-up.

**Results:** During initial assessment the following tests are recommended: medical history, physical examination including digital-rectal examination, International Prostate Symptom Score, urinalysis, serum creatinine and prostate specific antigen measurement, uroflowmetry and post-void residual volume. All other tests are optional or not recommended. Aim of treatment is to improve LUTS and quality of life and to prevent severe BPE-related complications. Development of a 5 $\alpha$ -reductase type I and II inhibitor and the data of the MTOPS trial providing scientific evidence for a combination therapy were the most significant innovations since the first version. Finally a more detailed knowledge on the natural history with identification of several risk factors for progression is the basis for a risk-profile orientated (preventive) therapy.

**Conclusions:** Updated recommendations for assessment, treatment, and follow-up of patients with LUTS due to BPO are presented.

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**Keywords:** BPH; Prostate; Guidelines; Treatment; Diagnosis

## 1. Background

Benign prostatic hyperplasia (BPH) and benign prostatic enlargement (BPE) are one of the most common diseases in aging men which can lead to lower urinary tract symptoms (LUTS). The relation between BPH, BPE and LUTS though is complex,

because not all men with BPE develop LUTS and not all men with LUTS have BPE.

With a changing demographic profile and an increasingly aging population in almost all societies, it is inevitable that this disorder will become even more prevalent and a major challenge for all health care systems in the future. In evolving fields of medicine, it is important that guidelines be updated on a regular 2–4 year basis so that the latest evidence-based medicine can be taken into account. Recent findings on the

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natural history of the disease, its progressive nature and new treatment modalities justify this update three years after the original version was published in this journal [1]. For space limitations, only key studies and reviews are referenced herein; an extensive bibliography is available in the full text version on the EAU homepage.

## 2. Progression and risk factors

Based on published data on consequences and complications of the disease, BPH, BPE and benign prostatic obstruction (BPO) can be considered progressive diseases. Key pieces of evidence are longitudinal population based studies and data of long-term randomized clinical trials (RCT) [2–4]. A group of patients at increased risk of progression can be identified based on specific risk factors, i.e. age, serum PSA and prostate volume and LUTS [5]. It might be appropriate to identify these patients at risk of progression and to initiate early preventive treatment [6].

## 3. Assessment

In contrast to the original guideline version, the panel has categorized diagnostic tests in three (and not four) categories, i.e. recommended, optional and not recommended.

- *Recommended*: there is evidence to support routine use of this test.
- *Optional*: not required during initial assessment but may aid in the decision-making process.
- *Not recommended*: there is no evidence to support the routine use of this test for the average patient.

Guidelines presented herein apply only to men (e.g. >50 years) without significant risk of non-BPO causes of LUTS. Men with LUTS not falling into this category (e.g. concomitant neurological diseases, young age, prior lower urinary tract disease or surgery) usually require a more extensive work-up (Table 1).

### 3.1. Recommended investigations

#### 3.1.1. Medical history

A medical history should be taken to identify other causes than BPE/BPO for LUTS.

#### 3.1.2. Symptom scores

Evaluating symptom severity is an important part of the initial assessment being helpful in allocating treatment and in predicting and monitoring the response to

**Table 1**

EAU 2004 recommendations regarding initial assessment for elderly men with LUTS suggestive of BPO

Assessment	EAU 2004 recommendation <sup>a</sup>
Medical history	recommended
Symptom score	recommended
Physical examination including DRE	recommended
Prostate specific antigen	recommended
Creatinine measurement	recommended
Urinalysis	recommended
Flow rate	recommended
Post-void residual volume	recommended
Pressure flow studies	optional
Endoscopy	optional
Imaging of the upper urinary tract	optional
Imaging of the prostate	optional
Voiding charts (diaries)	optional
Excretory urography	not recommended
Filling cystometry	not recommended
Retrograde urethrogram	not recommended
Computed tomography	not recommended
(Transrectal) magnetic resonance imaging	not recommended

<sup>a</sup> For detailed information see text.

therapy. Probably the best way to assess symptom severity is with a validated symptom score; the International Prostate Symptom Score (IPSS) has become the international standard. Three categories of symptom severity were described using the IPSS: mild 0–7, moderate 8–19 and severe 20–35. Numerous authors have reported and commented upon the poor correlation between IPSS and objective parameters such as flow rate, prostate volume and post-void residual volume. These data emphasize that a proper diagnosis cannot be made by symptomatic assessment alone. Equally important as pure symptomatic assessment is to determine the impact on quality of life; the global quality of life question in the IPSS seems to be sufficient for this purpose.

#### 3.1.3. Physical examination

A physical examination including a digital-rectal examination (DRE) and a focused neurological examination is recommended during initial assessment. DRE is useful in evaluating the size of the prostate (although it tends to underestimate prostate volume), to exclude (together with PSA) the presence of prostate cancer (PC) and prostatitis and other pelvic pathologies.

#### 3.1.4. Prostate specific antigen

As in the original version of these guidelines, the conclusions of the 1997 International Consensus Meeting were accepted [1]. In general a PSA-test should be offered to those with at least a 10-year life expectancy and for whom knowledge of the presence of PC would

change management. Recent studies suggest that PSA (as a proxy parameter for prostate volume) can be used to evaluate the risks of either requiring surgery or developing acute urinary retention [5,6].

### 3.1.5. Creatinine measurement

BPO may cause upper urinary tract dilatation and renal failure. In patients undergoing prostatectomy, 15–30% present with azotaemia; in those presenting with LUTS only, the incidence is lower (10%) [7]. When renal impairment is present, however, diabetes and hypertension, and not BPO, are the most probable causes of creatinine elevation. Recent data of the MTOPS trial have shown that the risk of developing *de novo* renal failure in men with LUTS is minimal (<1%) suggesting that it is not necessary to control the serum creatinine if voiding remains compensated [8]. As it is difficult to select those with renal insufficiency, it is probable cost effective to measure serum creatinine levels in all patients at initial evaluation. An alternative to serum creatinine measurement is ultrasonography of the upper urinary tract (see below).

### 3.1.6. Urinalysis

Although BPO is the most frequent cause of LUTS in men, they can also be caused e.g. by urinary tract infection or bladder cancer. Therefore the panel recommended urinalysis during initial evaluation although there is little evidence in the literature to support this conclusion.

### 3.1.7. Flow rates

Uroflowmetry is recommended as a diagnostic test in the initial assessment of men with LUTS and should always be performed prior prostatectomy. It is a simple, non-invasive test that can reveal abnormal voiding. Serial flows (two or more) with a voided volume exceeding 150 ml are recommended to obtain a representative flow test.

### 3.1.8. Post-void residual volume

Post-void residual (PVR) urine measurement is recommended. It should be calculated by measurement of the bladder height, width, and length obtained by transabdominal ultrasonography. This is a simple, accurate and non-invasive method. Large PVR volumes (>200 ml) may indicate bladder dysfunction and predict a less favorable response to treatment.

## 3.2. Optional tests

### 3.2.1. Pressure flow studies

Non-invasive flow rates only determine the probability of BPO, whereas pressure flow studies (pQs)

can categorize the degree of obstruction and identify patients in whom a low flow rate may be due to a low-pressure detrusor contraction. Although pQs are the only means in diagnosing obstruction accurately, the debate continues as to their role in predicting treatment outcomes. The methodology for performing pQs is standardized and requires simultaneous recording of both intravesical and intra-abdominal pressure [9]. Different nomograms exist with which to classify patients into categories of obstruction; the ICS (International Continence Society) nomogram has now been adopted as the standard nomogram [9]. Although pQs are considered optional for the average patient, the panel recommends their use prior prostatectomy under the following circumstances: (i) if the voided volume is <150 ml or  $Q_{\max}$  >15 ml/s prior surgical intervention particularly in the elderly to document the presence of BPO; (ii) younger men (e.g. <50 years); (iii) elderly men (>80 years); (iv) PVR >300 ml; (v) suspicion of neurogenic bladder dysfunction (e.g. Mb. Parkinson); (vi) after radical pelvic surgery; (vii) previous unsuccessful invasive treatment.

### 3.2.2. Endoscopy

Urethroscopy is the standard procedure for endoscopic evaluation of the lower urinary tract. It can provide useful information as to the cause, size, and severity of obstruction, patency of the bladder neck, prostatic occlusion of the urethra, and estimated prostate size. An endoscopy is recommended prior surgical or minimal invasive therapy, particularly if treatment depends on prostate shape (e.g. middle lobe) or size. In addition, urethroscopy is indicated in men with a history of haematuria, urethral stricture, bladder cancer, or prior lower urinary tract surgery. However, endoscopy is not indicated in the initial evaluation of the average patient without these risk factors or if watchful waiting or medical therapy is initiated.

### 3.2.3. Imaging of the urinary tract

**3.2.3.1. Upper urinary tract.** Routine imaging of the upper urinary tract is not indicated for the average patient if serum creatinine measurement is performed. The preferred method (particularly if serum creatinine is not determined) is renal ultrasonography because of a better identification of renal masses, possibility of investigating the liver and the retroperitoneum, simultaneous evaluation of the bladder, post-void residual volume and the prostate, costs, avoidance of irradiation and absence of side effects. It needs to be emphasized that the primary indication for renal ultrasonography is to detect hydronephrosis

and not renal masses, because the incidence of renal masses in a LUTS population is not higher than in the general population

**3.2.3.2. Prostate.** Transrectal (preferred) or transabdominal ultrasonography of the prostate are appropriate investigations to assess prostate volume and shape. Ultrasound examination of the prostate is not routinely indicated in patient's prior watchful waiting or medical therapy with  $\alpha$ 1-blockers. Assessment of size and shape of the prostate is indicated prior minimally invasive therapy, for the selection of surgical therapy (TUIP, TURP, open prostatectomy) and prior medical therapy with 5 $\alpha$ -reductase inhibitors (5ARI). New concepts such as the presumed circle area ratio (PCAR) warrant further studies before their use is recommended [10].

### 3.2.4. Voiding charts (diaries)

Voiding charts are simple to complete, cheap and can provide useful and objective information. There is no standard frequency volume chart available. However, recent data suggest that a 24-hour voiding chart is sufficient for the average patients and that longer time periods provide only little additional information [11].

### 3.3. Not recommended tests

The following tests are not recommended during initial assessment of the average patient: excretory urography, filling cystometry, retrograde urethrogram, computed tomography, (transrectal) magnetic resonance imaging.

## 4. Treatment

The aim of therapy is to improve LUTS and quality of life and to prevent BPE/BPO-related complications, such as urinary retention or upper urinary tract dilatation. Initial management of men with LUTS suggestive of BPO can be categorized into (i) watchful waiting (WW), (ii) medical therapy, (iii) surgical management, and (iv) non-surgical, i.e. minimally invasive (Table 2).

### 4.1. Watchful waiting

WW is a viable option to many men as the risk of progression (acute urinary retention, need for surgery, renal insufficiency, bladder stones) is small [12]. It is customary for this type of management to include the following components: education, reassurance, periodic monitoring and lifestyle advice [13]. Optimization of WW can be achieved with lifestyle modifications

**Table 2**

EAU 2004 recommendations regarding treatment for elderly men with LUTS suggestive of BPO

Treatment	EAU 2004 recommendation <sup>a</sup>
Watchful waiting	recommended
Medical therapy	
$\alpha$ 1-blocker	
Alfuzosin	recommended
Doxazosin	recommended
Tamsulosin	recommended
Terazosin	recommended
5ARI	
Dutasteride	recommended
Finasteride	recommended
Combination therapy	
$\alpha$ 1-blocker plus 5ARI	recommended
Plant extracts	not recommended
Minimally invasive therapies	
High-energy TUMT	recommended
TUNA <sup>b</sup>	recommended
Prostatic stents <sup>c</sup>	recommended
Surgical therapies	
TUIP	recommended
TURP	recommended
Open prostatectomy	recommended
Transurethral holmium laser enucleation	recommended
Transurethral laser vaporization <sup>b</sup>	recommended
Interstitial laser coagulation <sup>b</sup>	recommended
Transurethral laser coagulation <sup>b</sup>	recommended
Emerging therapies	
Ethanol injection	
High-intensity focused ultrasound	
Water-induced thermotherapy	
PlasmaKinetic <sup>TM</sup> tissue management	

<sup>a</sup> For detailed information particularly regarding indications and limitations see text.

<sup>b</sup> Not as a first-line treatment.

<sup>c</sup> Only for high-risk patients as an alternative for permanent catheterization.

including reduction of fluid intake, avoidance or moderation of caffeine/alcohol, distraction techniques (penile squeezing, breathing exercises), bladder retraining, reviewing medication, assistance when there is impairment of dexterity, mobility and mental state and treatment of constipation [13].

**Recommendation:** WW is recommended for patients with minimal symptoms or moderate/severe symptoms with little impairment of quality of life. Reassurance, periodic monitoring and lifestyle modifications are advisable.

### 4.2. Medical therapy

#### 4.2.1. 5ARIs

Currently two 5ARIs, one selectively inhibiting 5 $\alpha$ -reductase type II (finasteride) and one inhibiting

5 $\alpha$ -reductase type I and II (dutasteride) are available [14]. Finasteride leads to a reduction of serum dihydrotestosterone (DHT) by 70–75%, the remaining DHT is the result of 5 $\alpha$ -reductase type I. Dutasteride induces a more profound reduction of serum DHT in the range of 90–95%. Both drugs have been extensively tested in several RCTs, for dutasteride two-year RCT data, for finasteride up to 5.5-year RCT-data are available [4,8,15]. Single-arm studies up to 10 years have been published for finasteride [16]. Both drugs reduce prostate volume by 20–30%, improve symptom score by 3–4 points and increase the  $Q_{\max}$  by 1.5–2.5 ml/s [4,8,14–16]. 5ARIs are more effective in men with BPE (>30–40 ml) [4,14–16]. Clinical efficacy is seen delayed, usually after 3–6 months. Although no published data of a head-to-head comparison are yet available, clinical efficacy of finasteride and dutasteride seems to be comparable. Both drugs lower serum PSA by approximately 50%, both do not mask early detection of PC. Side effects mainly relate to sexual function with a decreased libido in 6%, erectile dysfunction in 8% and decreased ejaculation in 4% [4,14,15]. Both drugs reduce the risk of acute urinary retention and the need for surgery by approximately 50% as compared to placebo [4,8,14,15].

*Recommendation:* 5ARIs are an acceptable treatment option for patients with moderate/severe LUTS and an enlarged prostate (>30–40 ml). 5ARIs may also be offered to patients with BPE to prevent progression of disease; potential disadvantages of this approach (long-term medication, side-effects, costs, PC) have to be carefully discussed with the patient.

#### 4.2.2. $\alpha$ -blockers

Alpha-blocker therapy is based on the hypothesis that LUTS are caused by  $\alpha$ 1-adrenergic mediated contraction of smooth muscle cells within the prostate, prostate capsule and bladder neck resulting in BPO. Within the past 10 years, market shares of alpha-blockers increased substantially and are currently the preferred 1st line medical therapy for men with moderate/severe LUTS. Alfuzosin, doxazosin, tamsulosin and terazosin have been extensively studied in RCTs with duration of up to 12 months (exception: doxazosin, see below) [17]. Symptom scores improve by 4–6 points, and  $Q_{\max}$  by 2–3 ml/s. Clinical efficacy are observed within 48 hrs and data of single-arm studies over several years are available.  $\alpha$ 1-blockers have no effect on prostate volume and PSA and do not prevent further prostate growth. The most commonly reported side effects are headaches, dizziness, postural hypotension, asthenia, nasal congestion and retrograde ejacu-

lation [17]. The MTOPS study demonstrated that doxazosin over 4 years had no effect on prostate volume and on the natural history of the disease, as the risk of retention and prostatectomy is delayed for 1–2 years with no significant reduction compared to placebo after a mean of 4.5 years [8]. A trial without a catheter (TWOC) under  $\alpha$ 1-blockade is recommended for patients presenting in acute urinary retention [18].

*Recommendation:*  $\alpha$ 1-blockers are an acceptable treatment option for patients with moderate/severe LUTS. All four  $\alpha$ 1-blockers (tamsulosin, terazosin, alfuzosin, doxazosin) have a similar clinical efficacy, although side-effect profiles for some drugs are reported to be more favorable.

#### 4.2.3. Plant extracts

Medical therapy of LUTS with plant extracts has a long tradition in some countries (e.g. Germany, France) and has recently gained popularity in other parts of the world as well. Despite the fact that several mechanisms have been proposed, their mode of action is unclear. Although a number of encouraging short-term studies and meta-analyses are available, only few fulfilled the WHO criteria, i.e. RCT, 12-month duration [19]. The few studies meeting these criteria, however, provided encouraging data, for example reference [20].

*Recommendation:* Further studies meeting the criteria proposed by WHO-BPH conference (12-month duration, randomised, placebo-controlled) are required before plant extracts can be recommended for the treatment of LUTS.

#### 4.2.4. Combination therapy

To date, four large randomised studies have addressed the role of combining  $\alpha$ 1-blockers with finasteride. The first three studies with a follow-up period of up to one year suggested no additional benefit of a combination therapy [21–23]. The recently published MTOPS trial with a mean follow-up of 4–5 years has now convincingly shown that combination therapy with 5ARI (finasteride) and  $\alpha$ 1-blocker (doxazosin) was the most effective treatment in reducing the risk of progression, acute urinary retention and the need of surgery [8].

*Recommendation:* The combination therapy with 5ARIs and alpha-blockers seems to be more beneficial and durable than monotherapy by either one of these drugs. The data available to support this are limited to the outcome of the MTOPS study analyzing finasteride and doxazosin.

### 4.3. Surgical management

#### 4.3.1. TUIP, TURP and open prostatectomy

Transurethral resection of the prostate (TURP), transurethral incision of the prostate (TUIP) and open prostatectomy are the conventional surgical options. Two RCTs are available for open prostatectomy; TURP and TUIP have been subjected to a number of RCTs [24]. The most frequent indication for prostatectomy is bothersome LUTS refractory to medical management. The following BPH/BPE complications are considered strong indications for surgery: refractory urinary retention, renal insufficiency, bladder stones, recurrent urinary tract infection, recurrent haematuria refractory to medical treatment with 5ARIs. TUIP is the method of choice for men with prostates <30 ml and no middle lobes, open prostatectomy for those with prostates >80–100 ml and TURP for those in between (90–95% of all cases) [24,25]. Intra- and postoperative morbidity has substantially decreased within the past two decades. Following surgical therapy, symptom scores improve by 15–20 points and  $Q_{\max}$  usually by 10 ml/s. Most frequent long-term complications are retrograde ejaculation (TUIP: 40%; TURP: 65–70%; open prostatectomy: 80%), bladder neck contracture/urethral strictures (<5%) and urinary incontinence (1–2%) [24,25]. Favorable long-term outcome is frequent, the re-operation rate is 1–2% per year. Compared to TURP and open prostatectomy, TUIP is associated with a higher rate of secondary procedures [24].

*Recommendation:* Surgical management is an appropriate treatment for men with moderate/severe LUTS who (i) did not improve after medical therapy, (ii) do not want medical therapy yet request active intervention, and (iii) present with a strong indication for surgery (see above).

#### 4.3.2. Transurethral electrovaporisation (TUVP)

By applying well-established electrosurgical principles, TUVP uses modified transurethral equipment, including a roller ball electrode with increased surface area and generators that deliver uninterrupted, high electrical energy [24]. The urine inside the bladder can be heated to temperatures exceeding 45°C unless continuous irrigation of the bladder is performed. Several RCTs comparing TUVP usually to TURP are available, improvements of symptom scores and  $Q_{\max}$  were usually in the range of TURP [24,26]. Rates of postoperative irritative voiding symptoms and dysuria are higher than after TURP. The major disadvantage of TUVP is that the clinical efficacy of the electrode rapidly decreases as tissue desiccates, i.e. with larger prostates. Promising long-term data are now available [26].

*Recommendations:* TUVP is an appropriate alternative to TURP particularly for high-risk patients with small-sized prostates.

#### 4.3.3. Laser prostatectomy

Four types of laser energies (Nd:YAG, Holmium:YAG, KTP:YAG and diode) have been used to treat BPE. Visual laser ablation of the prostate (VLAP) results in equivalent short-term improvements in symptom scores, urinary flow rate, and quality of life indices when compared to TURP as demonstrated in several RCTs [27]. The rates of postoperative urinary retention and the need for unplanned secondary catheterization after VLAP (non-contact technique) are higher than for TURP. A major limitation of VLAP is the lack of immediate effect and requirement for post-operative catheterization for up to 6 weeks [27,28]. Interstitial laser coagulation induces an intraprostatic coagulative necrosis, two RCTs are available, yet reliable long-term data are missing [29]. Holmiumlaser resection of the prostate (HoLRP) has been subjected to RCTs against TURP but also open prostatectomy. While clinical efficacy seems to be comparable, the risk of bleeding is substantially reduced and length of hospitalization and catheterization reduced [30]. During transurethral laser vaporization prostatic tissue is vaporized by laser energy, similarly as during TUVP. Results and limitations are similar as after TUVP.

*Recommendations:* Laser prostatectomy is generally indicated for high-risk patients requiring invasive therapy. HoLRP seems to be a viable alternative to TURP irrespective of any anatomical configuration.

#### 4.4. Transurethral microwave thermotherapy (TUMT)

TUMT uses computer-regulated microwaves to deliver heat through a transurethral catheter to destroy prostatic tissue. A cooling system protects the prostatic urethra during the procedure. TUMT is by far the most popular minimally invasive treatment with more than 100,000 patients treated worldwide. A number of different devices are available, only few have been tested in RCT. Low- and particularly high-energy protocols (currently the preferred method) have been tested in a number of RCTs [31,32]. High-energy TUMT produces significant subjective and objective improvement, with sustained and durable long-term results (failure rate of 2–10%/year). Morbidity consists mainly of the need for catheter drainage (up to 6 weeks). Advantages of TUMT are the avoidance of anesthesia and that it is a pure outpatient procedure, which is rather simple and

has a short learning curve. The recently published updated AUA-BPH guidelines emphasize safety recommendations published by the FDA to avoid unexpected procedure-related injuries, such as urethral fistulas in patients with previous pelvic irradiation and give clear device recommendations [33].

*Recommendations:* TUMT should be reserved for patients who prefer to avoid surgery, who no longer respond favourably to medication and who do not want long-term medication. TUMT is also suitable for high-risk patients presenting with recurrent urinary retention.

#### 4.5. Transurethral needle ablation of the prostate

TUNA is a simple and safe technique, which can be performed under local anesthesia, in a significant number of patients. Symptoms improve by 8–10 points and  $Q_{\max}$  increases by a mean of 3–4 ml/s. There is only one RCT available and limited information on long-term efficacy [34,35].

*Recommendations:* TUNA is not recommended as a first-line therapy for the average patient, yet is indicated in high-risk patients unfit for surgery.

#### 4.6. Prostatic stents

Due to significant complications, such as encrustation, infection and chronic pain, prostatic stents are only indicated in high-risk patients presenting in recurrent urinary retention as an alternative to catheterization and who are unfit for surgery.

#### 4.7. Emerging techniques

High-intensity focused ultrasound, chemoablation of the prostate, water induced thermotherapy and the use of plasma energy in a saline environment (PlasmaKinetic™ Tissue Management System) are emerging techniques, which should not be used outside the framework of clinical trials.

#### 4.8. Obsolete techniques

Balloon dilatation and (transrectal or transurethral) hyperthermia (therapeutic temperatures <37) are obsolete for this indication.

### 5. Follow-up

All patients who receive treatment (including WW) require follow-up, which depends on the severity of the disease and the type of treatment modality. The panel decided that prior recommendations are still valid; the reader is therefore referred to the first guideline version [1].

### 6. Summary

This report represents the first update of the EAU BPH guidelines published in 2001 in this journal. With the exception regarding the recommendation for serum creatinine measurement, these guidelines correlate closely to the recently published first update of the AUA guidelines that were produced by an sophisticated methodology including a variety of meta-analytic techniques and by peer reviewing of 58 experts [33]. Regarding assessment minor modifications were made, such as the categorization of tests into only three (first version: 4) groups, i.e. recommended, optional and not recommended. Serum PSA measurement (first version: optional), medical history (first version: not mentioned) and urinalysis (first version: not mentioned) were now included to complete the recommended tests. Regarding therapy the introduction of a 5ARI type I and II (dutasteride) and the data of the MTOPS trial were the most significant innovations. Finally a more detailed knowledge on the natural history of the disease with the identification of several risk factors for progression provides the basis for a risk profile orientated therapy.

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