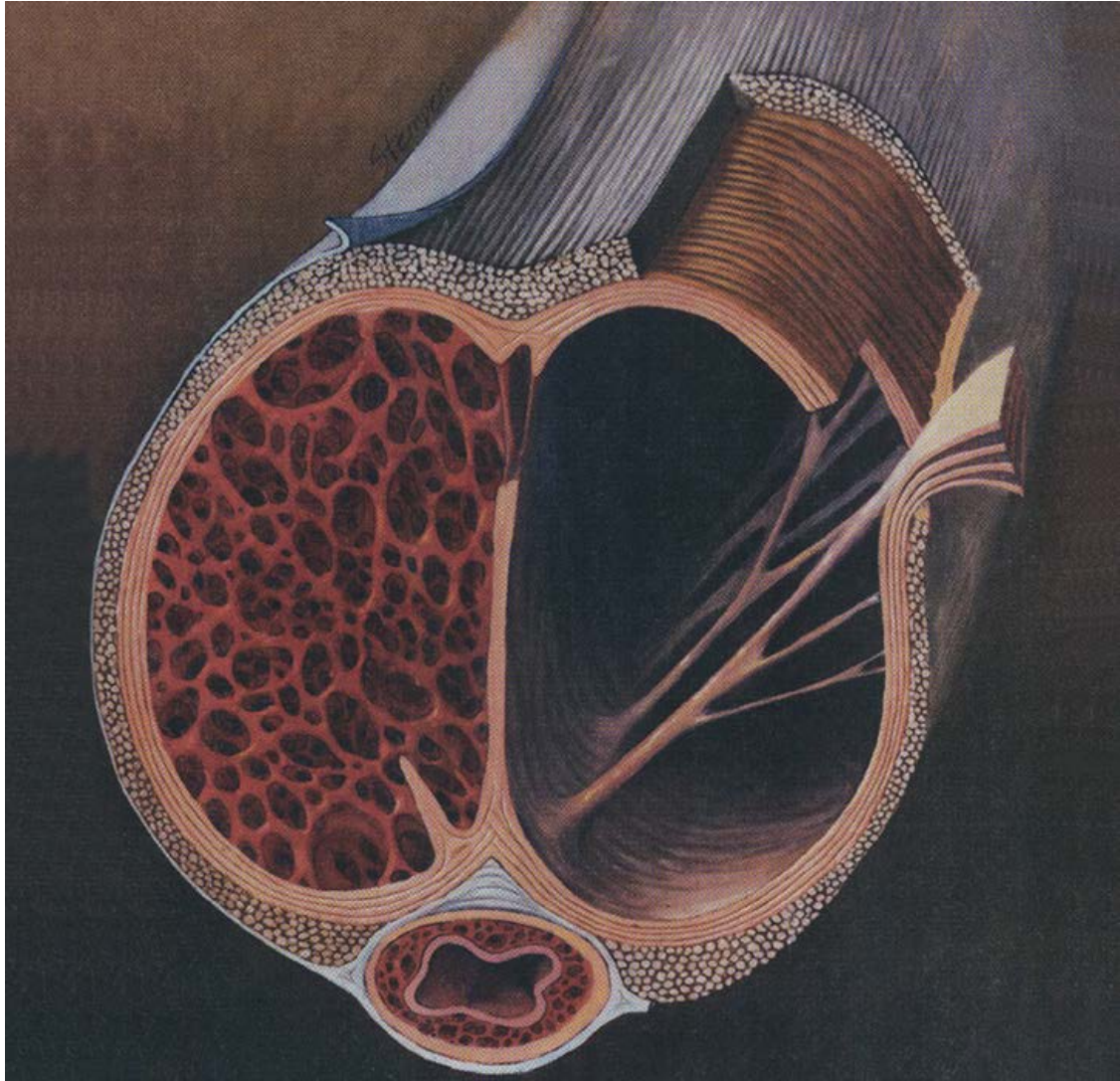


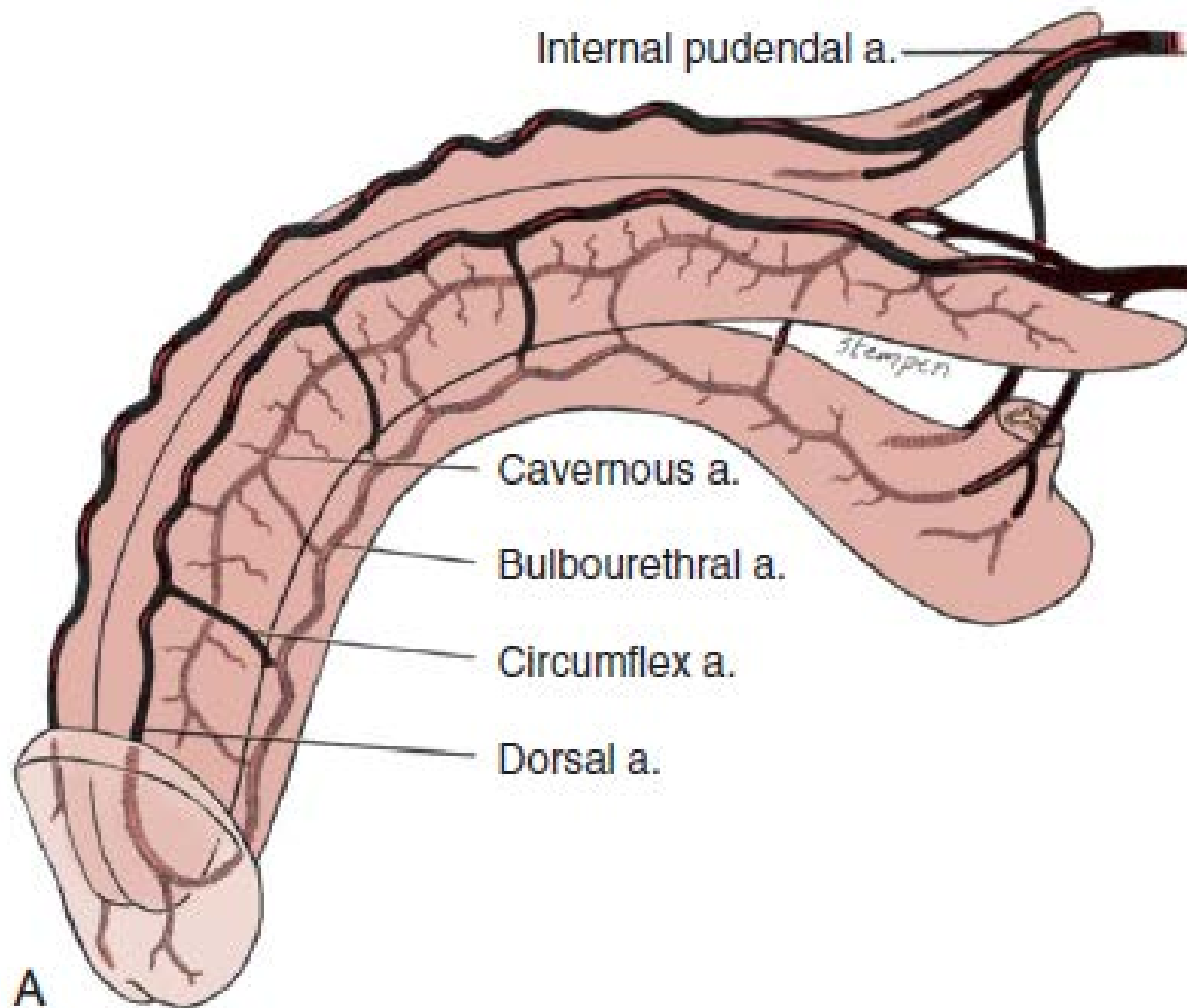
Erectile dysfunction

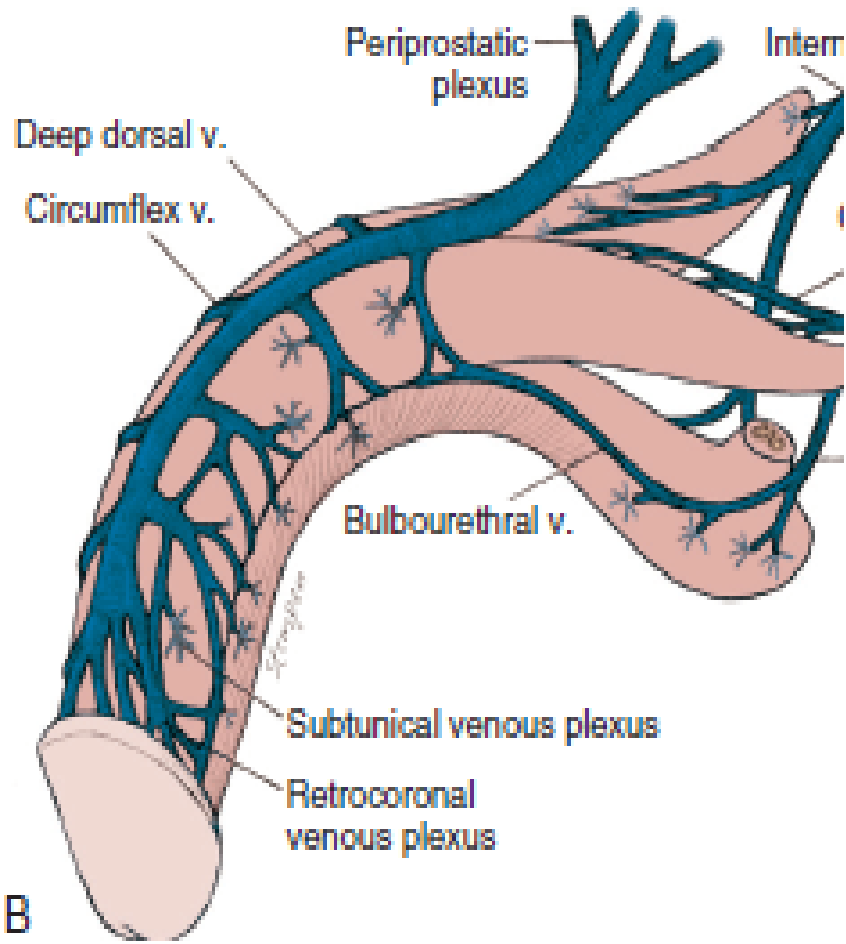
By Anas Hindawi

Supervised by Dr Khalid AL Sayyid

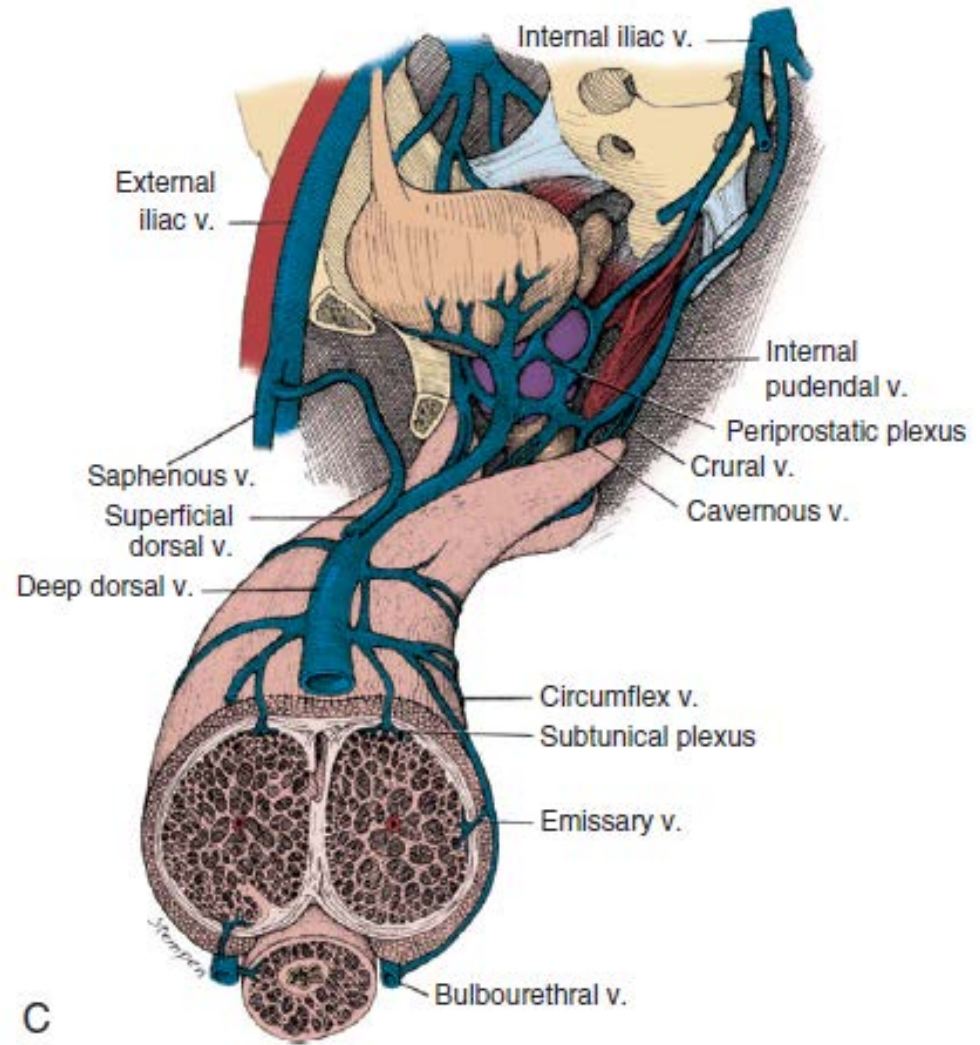
- ED is the persistent/recurrent inability to attain and/or maintain a penile erection rigid enough for satisfactory sexual intercourse
- There is increasing evidence that ED can be an early manifestation of coronary artery and peripheral vascular disease



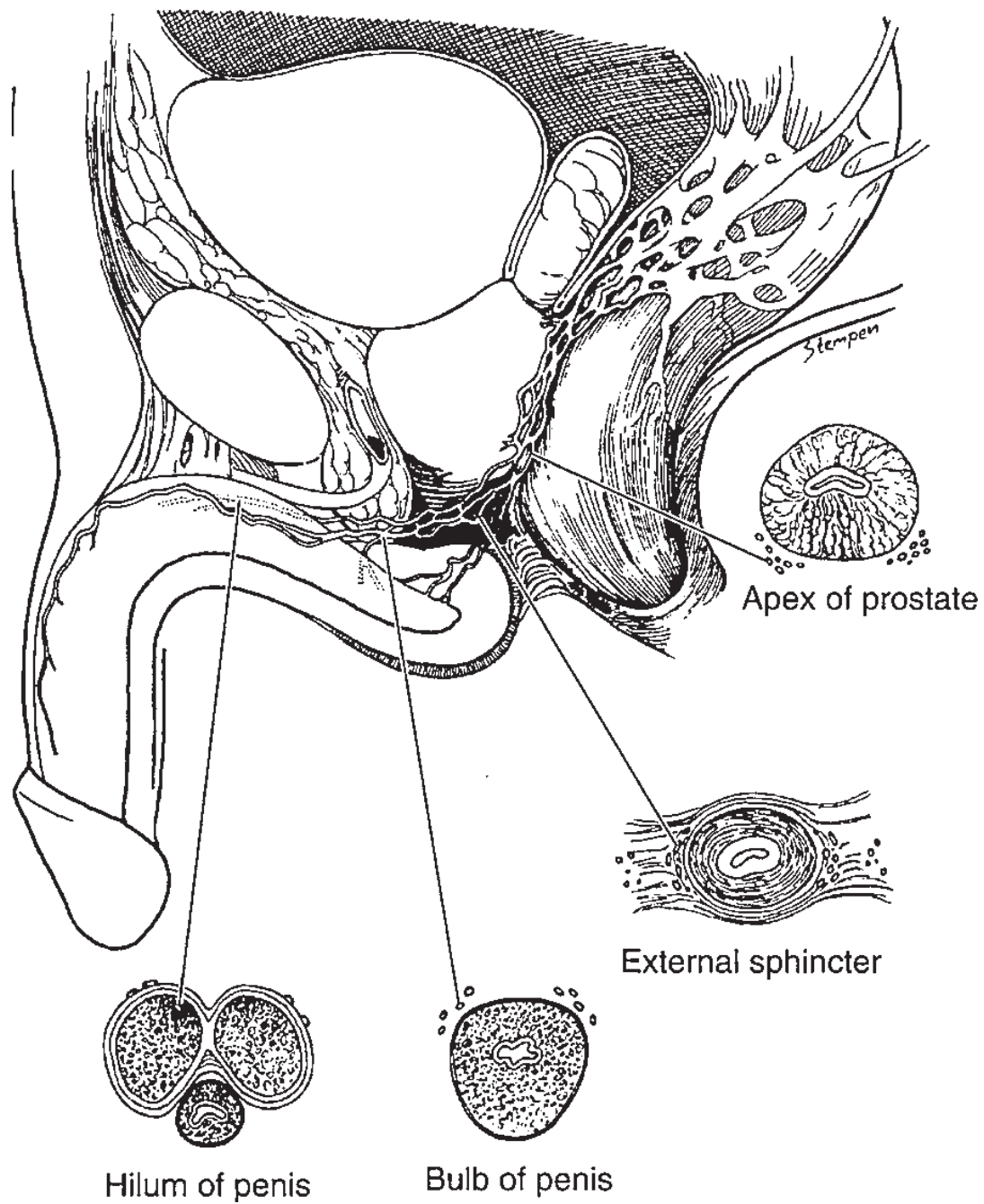




B



C



Stempen

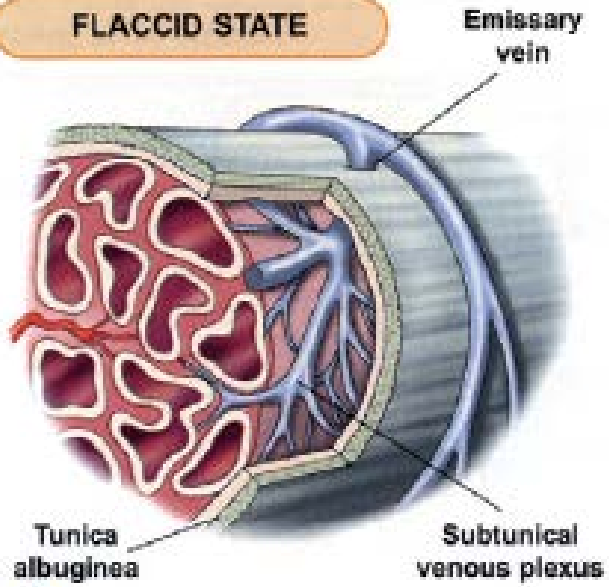
Apex of prostate

External sphincter

Hilum of penis

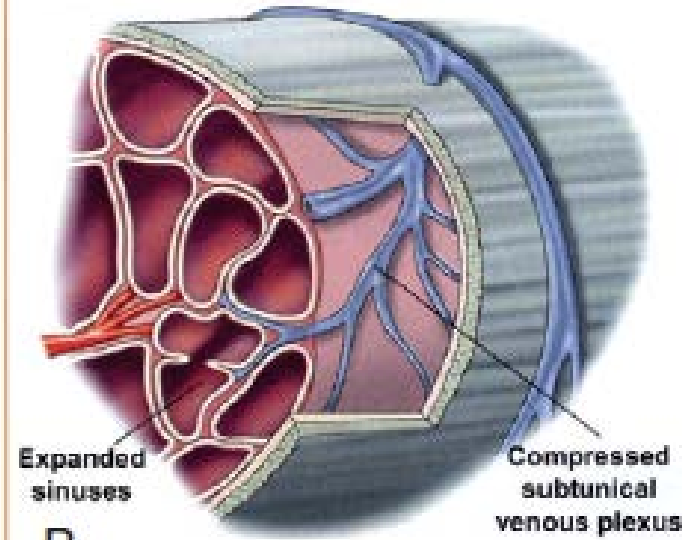
Bulb of penis

FLACCID STATE

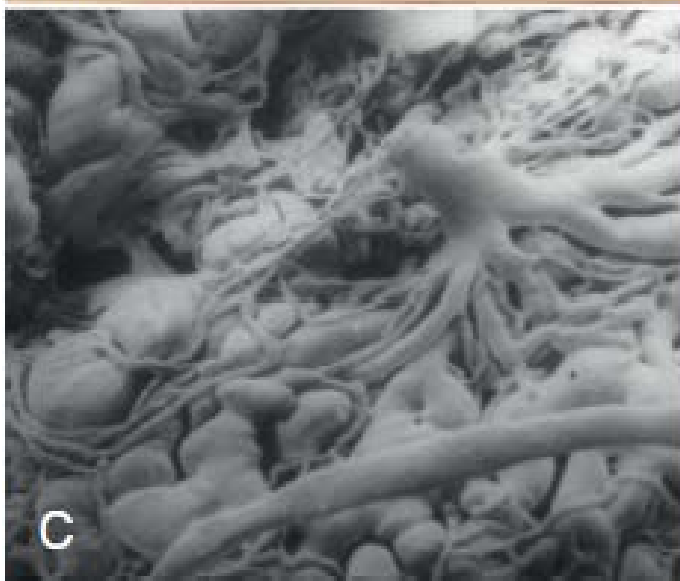


A

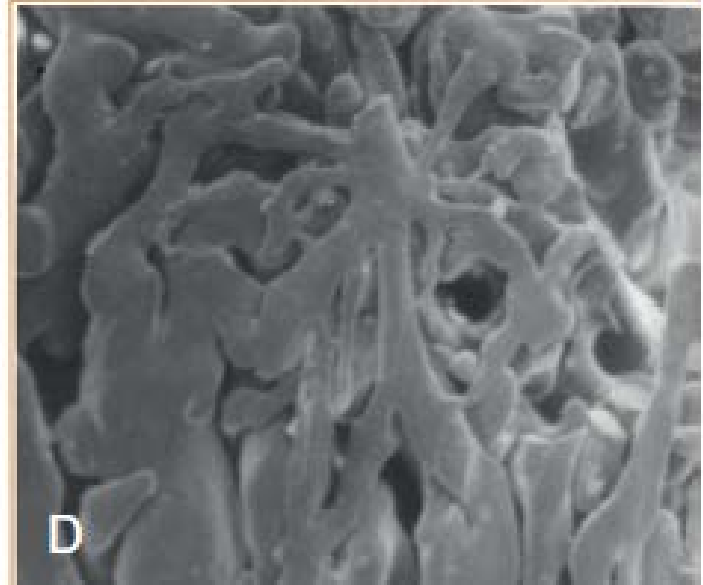
ERECT STATE



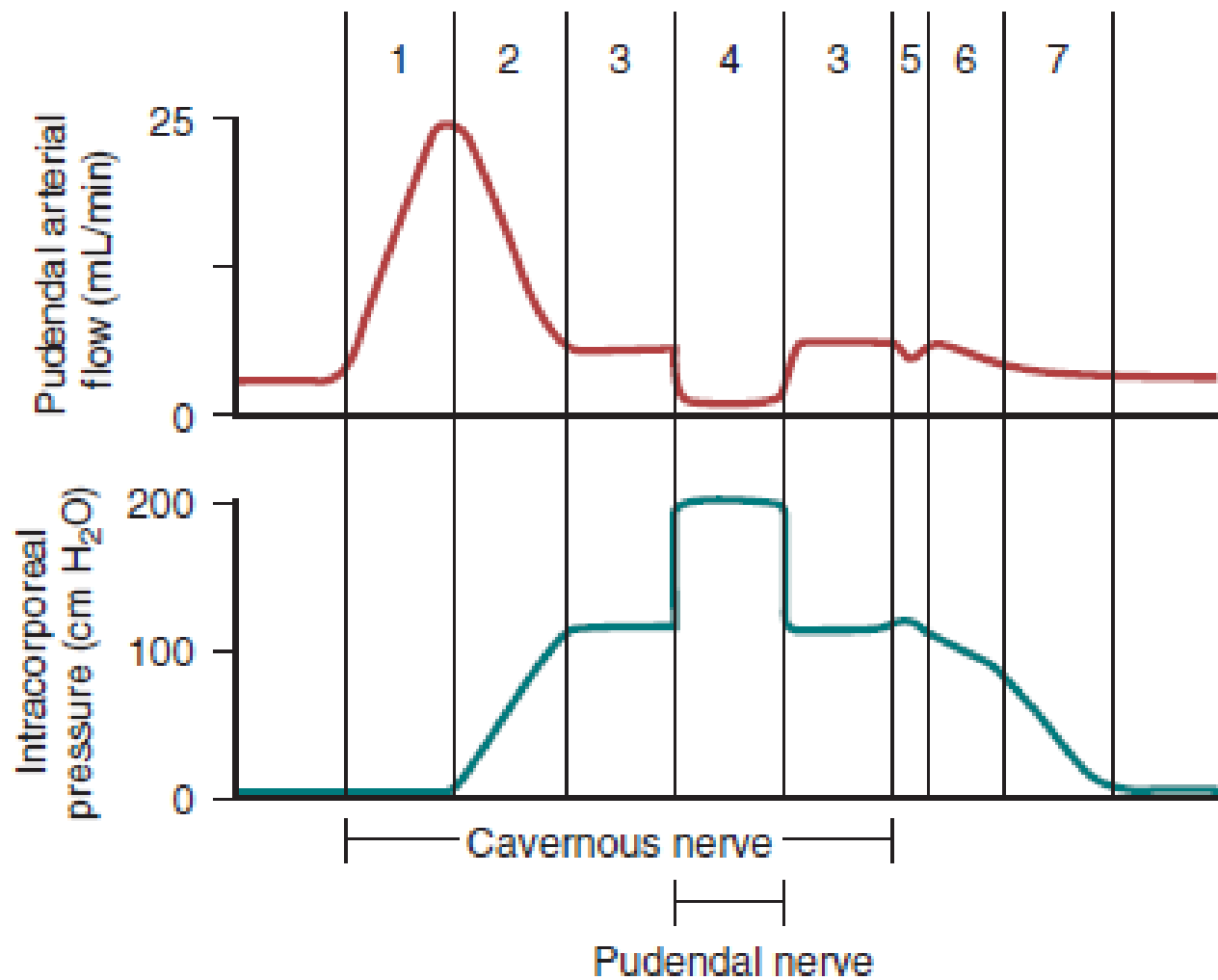
B



C



D



According to data from the Massachusetts Male Aging Study, ED affects how many men older than 50 years?

- More than 50%. The prevalence of ED increases with age

- Less than 10% of men in their 20s and 30s complain of ED, but the condition has been reported in men of all ages

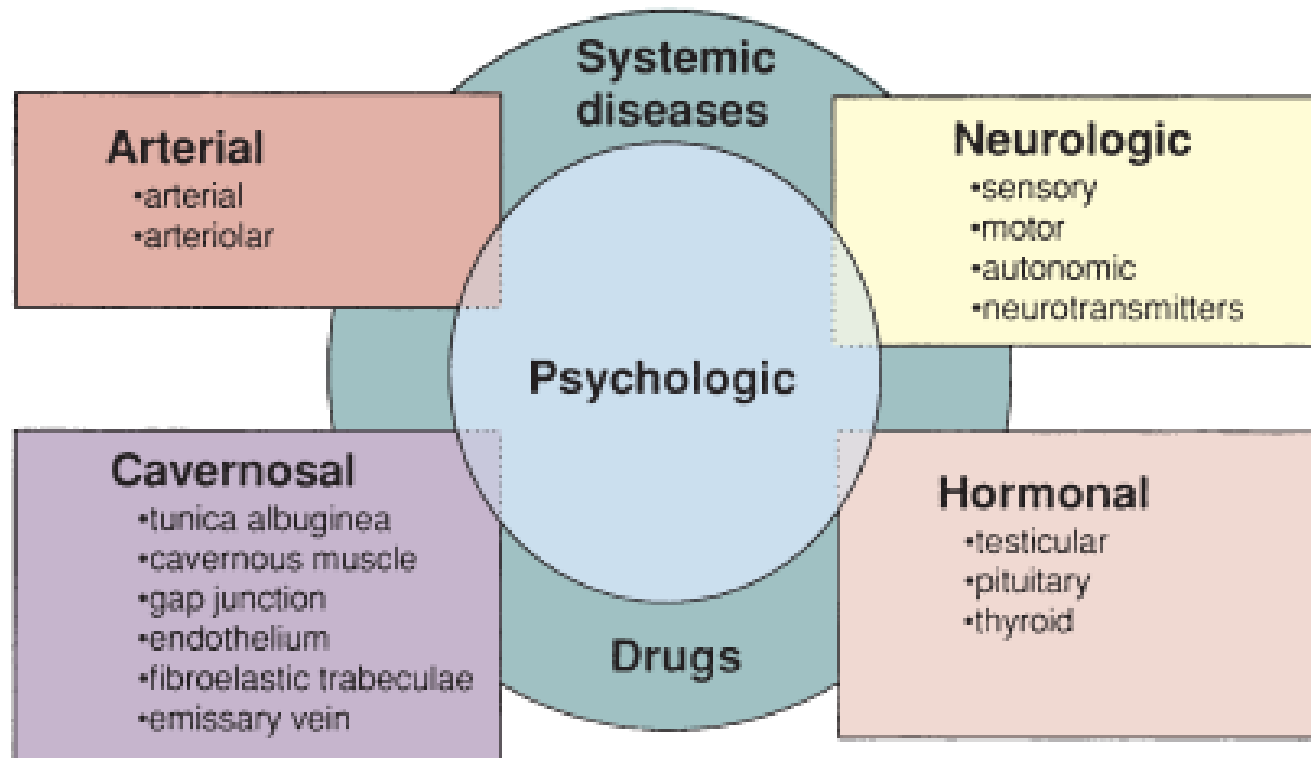
What are the most common risk factors for ED?

- Organic
- Psychogenic
- Mixed

Organic or psychogenic ?

| | Organic | Psychogenic |
|--|---------|-------------|
| Was onset abrupt ? | No | Yes |
| Is impotence stress dependent ? | No | Yes |
| Is Libido preserved ? | Yes | No |
| Do you have morning erections ? | No | Yes |
| Do you have orgasms ? | Yes | No |
| Can you masturbate ? | No | Yes |
| Does impotence occur with all partners ? | Yes | No |

Pathophysiology of ED



Vasculogenic

| | |
|---|---|
| - | Cardiovascular disease (hypertension, coronary artery disease, peripheral vasculopathy, etc.) |
| - | Diabetes mellitus |
| - | Hyperlipidaemia |
| - | Smoking |
| - | Major pelvic surgery (RP) or radiotherapy (pelvis or retroperitoneum) |

What classes of antihypertensive medication are most often associated with ED?

- Alpha Blockers and thiazides. While all antihypertensives have been associated with some degree of ED
- There is some evidence that ACEI's Ca channel blockers, and ARB's may have a neutral or even positive effect on erectile function in some hypertensive men

Neurogenic

Central causes

- Degenerative disorders (multiple sclerosis, Parkinson's disease, multiple atrophy, etc.)
- Spinal cord trauma or diseases
- Stroke
- Central nervous system tumours

Peripheral causes

- Type 1 and 2 diabetes mellitus
- Chronic renal failure
- Polyneuropathy
- Surgery (major surgery of pelvis/retroperitoneum, RP, colorectal surgery, etc.)
- Surgery of the urethra (urethral stricture urethroplasty, etc)

Why is diabetes a particularly severe risk factor for ED?

- Neuropathy and vascular disease are common in men with diabetes.
- Associated with decreased levels of circulating testosterone and damage to endothelial and smooth muscle cells

| | |
|---------------------------------|--|
| Anatomical or structural | |
| - | Hypospadias, epispadias |
| - | Micropenis |
| - | Peyronie's disease |
| Hormonal | |
| - | Hypogonadism |
| - | Hyperprolactinemia |
| - | Hyper- and hypothyroidism |
| - | Hyper- and hypocortisolism (Cushing's disease, etc.) |
| | Panhypopituitarism and multiple endocrine disorders |

Drug-induced

- Antihypertensives (thiazide diuretics, etc.)
- Antidepressants (selective serotonin reuptake inhibitors, tricyclics)
- Antipsychotics (neuroleptics, etc.)
- Antiandrogens (GnRH analogues and antagonists)
- Recreational drugs (alcohol, heroin, cocaine, marijuana, methadone, synthetic drugs, anabolic steroids, etc.)

Psychogenic

- Generalised type (e.g., lack of arousability and disorders of sexual intimacy)
- Situational type (e.g., partner-related, performance-related issues or due to distress)

Trauma

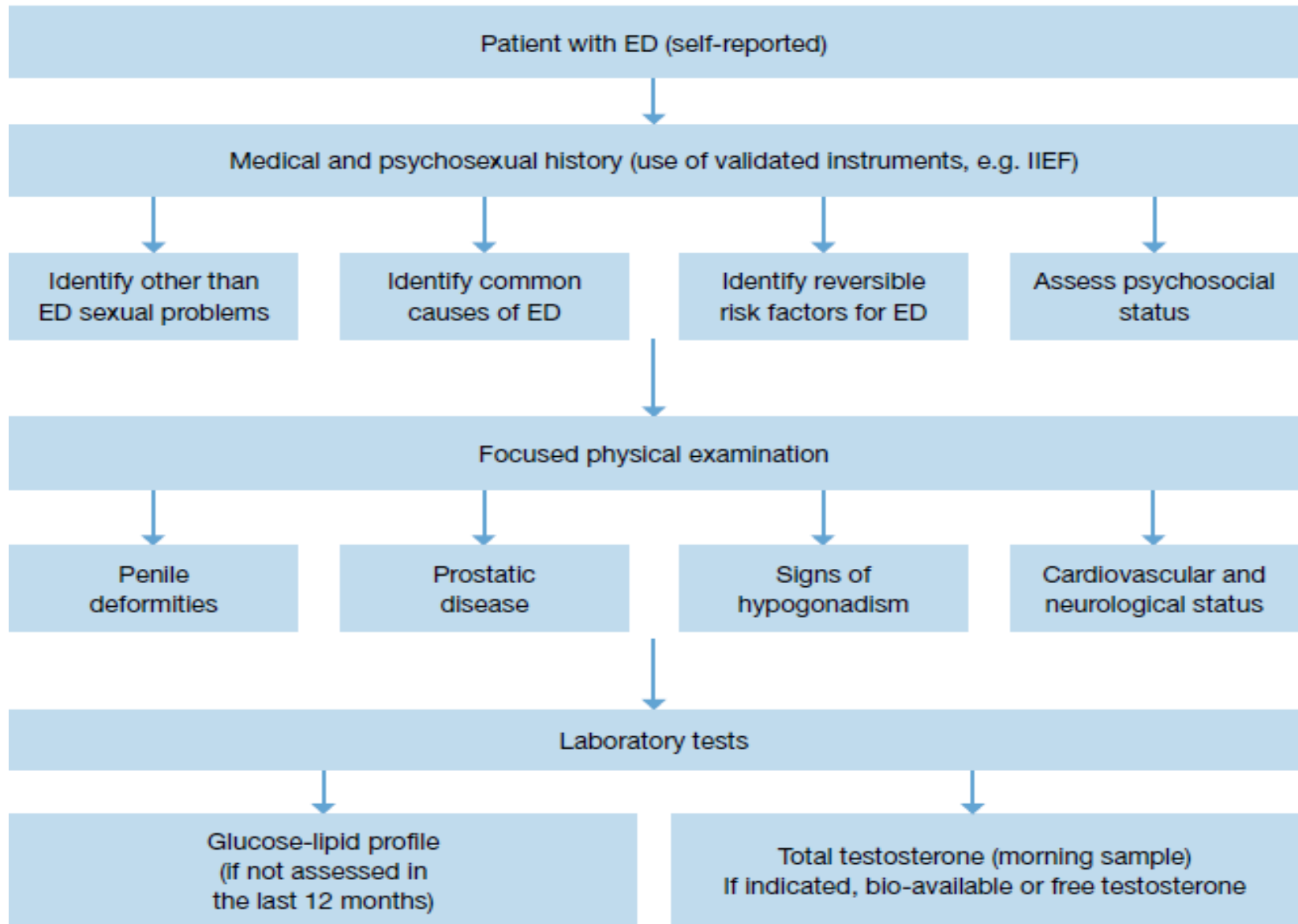
- Penile fracture
- Pelvic fractures

Post-radical prostatectomy ED, postradiotherapy ED & postbrachytherapy ED

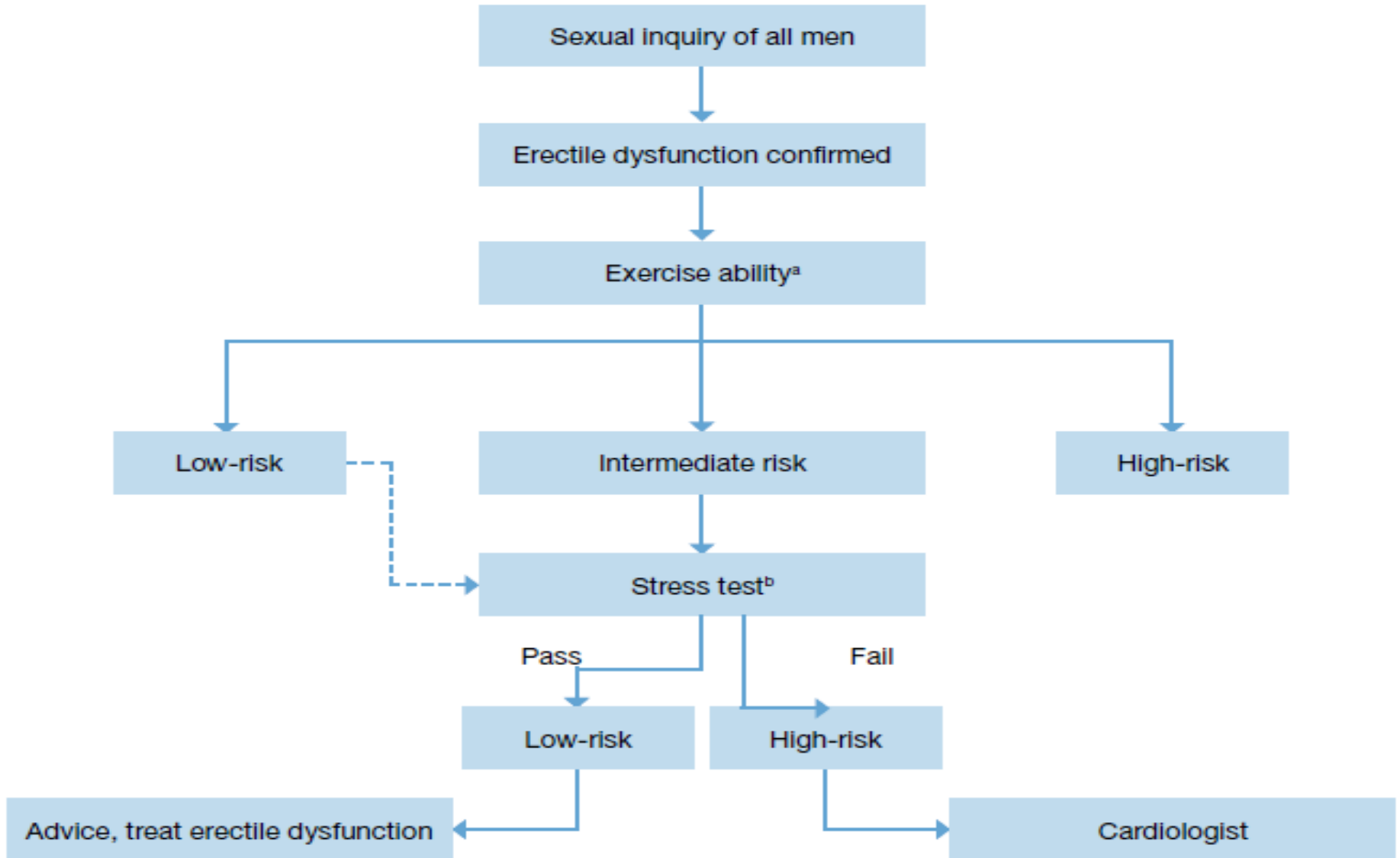
- Patient age and surgical volume, with the ability to preserve neurovascular bundles, seem to be the main factors in promoting the highest rates of post-operative potency
- Pre-operative potency is a major factor associated with the recovery of erectile function (EF) after surgery

- The mechanisms contributing to ED after prostate irradiation involve injury to the neurovascular bundles, penile vasculature, and cavernosal structural tissue
- It is shared opinion that the timing of post-operative therapy (any type) should be as close as possible to the surgical procedure

Minimal diagnostic evaluation (basic work-up) in patients with ED



Treatment algorithm for determining level of sexual activity according to cardiac risk in ED (based on 3rd Princeton Consensus)



Indications for specific diagnostic tests

Primary ED (not caused by organic disease or psychogenic disorder).

Young patients with a history of pelvic or perineal trauma, who could benefit from potentially curative vascular surgery.

Patients with penile deformities which might require surgical correction (e.g., Peyronie's disease, congenital curvature).

Patients with complex psychiatric or psychosexual disorders.

Patients with complex endocrine disorders.

Specific tests may be indicated at the request of the patient or his partner.

Medico-legal reasons (e.g., implantation of penile prosthesis, sexual abuse).

Specialised diagnostic tests

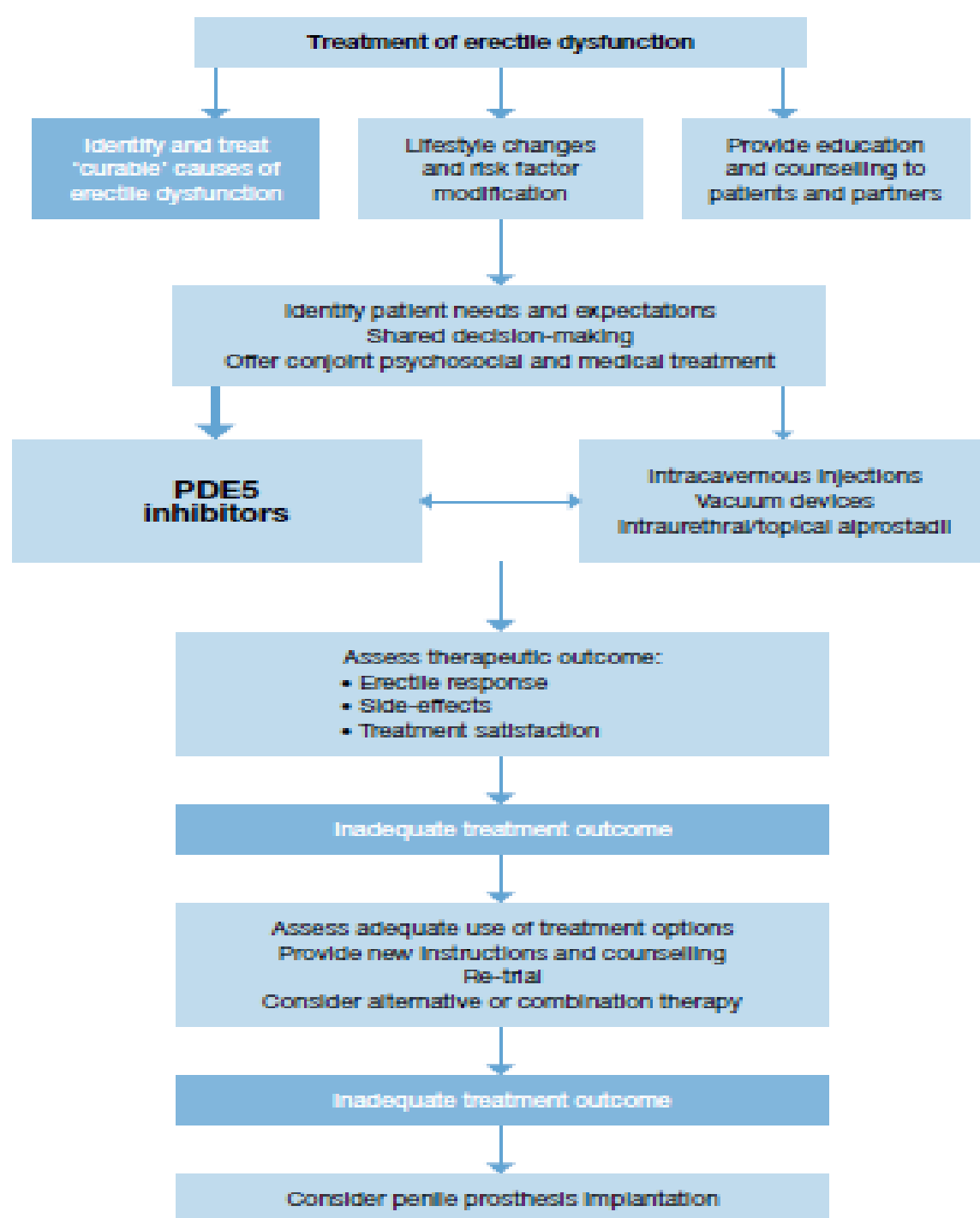
- Nocturnal penile tumescence and rigidity test
- Intracavernous injection test
- Duplex ultrasound of the penis
- Arteriography and dynamic infusion cavernosometry or cavernosography
- Psychiatric assessment
- Penile abnormalities

What role does penile color Doppler ultrasound play in the diagnosis of ED?

- This is the Gold Standard test for vasculogenic ED in the modern era

A patient is seen for a complaint of decreased libido. Physical examination is normal. What is an appropriate initial endocrine evaluation?

- TSH, Free T4, and a morning (between 8 and 11 a.m.) free and total testosterone level are good initial screening tests



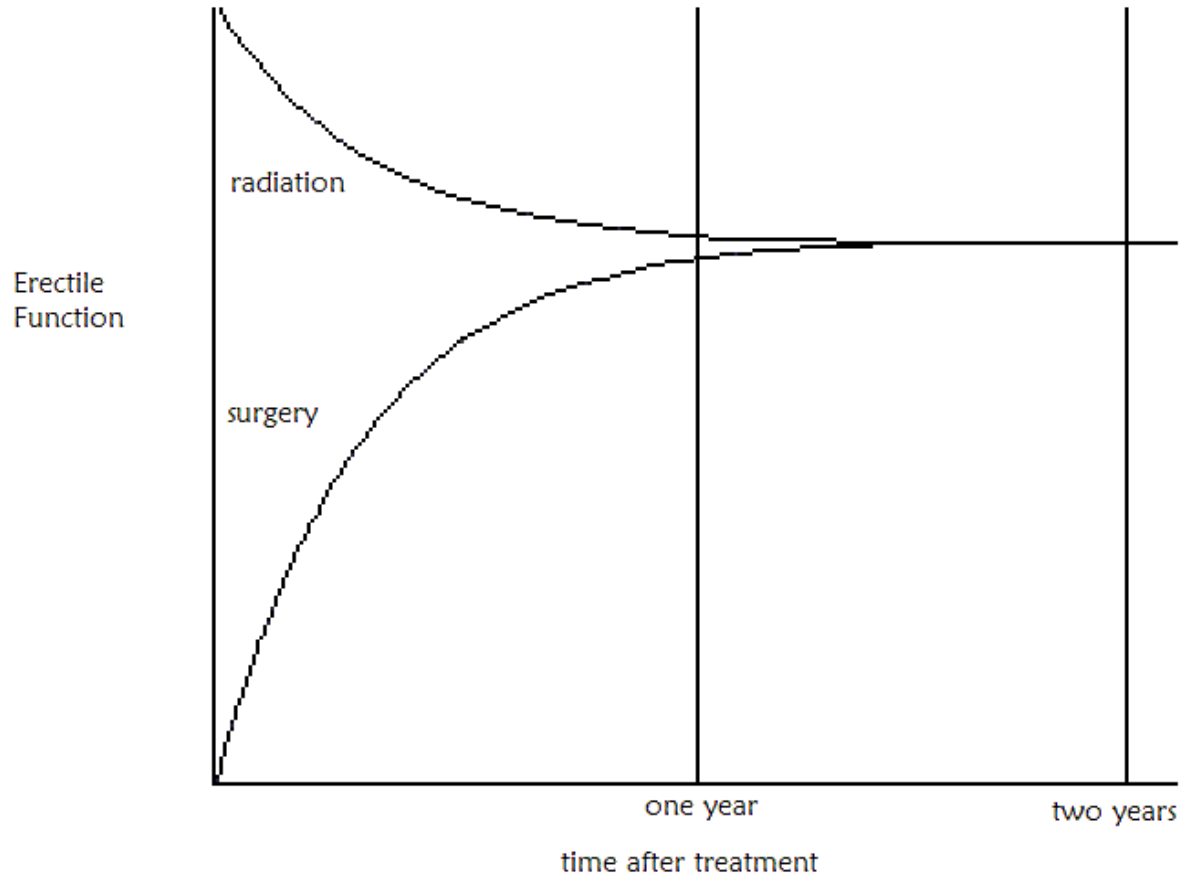
Causes of ED that can be potentially treated with a curative intent

- Hormonal causes
- Post traumatic arteriogenic ED
- Psychosexual consult

What evaluation is required before starting a man on supplemental testosterone?

- It is essential to obtain basic electrolytes, LFTs, CBCD and a serum PSA
- A DRE should be performed to rule out occult Pca
- Men with prostate or breast cancer, LUTS referable to an enlarged prostate, severe heart failure, severe sleep apnea, and/or polycythemia should be cautioned that testosterone may exacerbate these problems although definitive data on the extent of these risks are lacking

ED prevalence with Prostate Cancer treatment



- Several trials have shown higher rates of EF recovery after RP in patients receiving any drug (therapeutic or prophylactic) for ED
- The response rate to sildenafil treatment for ED after RP in different trials has ranged from 35% to 75% among those who underwent NSRP and from 0% to 15% among those who underwent non-NSRP
- Early use of high-dose sildenafil after RP has been suggested to be associated with preservation of smooth muscle within the corpora cavernosa

1st line therapy

- PDE5 inhibitors
- VED's
- Shockwave therapy

What is PDE5?

- Phosphodiesterase refers to an enzyme that breaks phosphodiester bonds
- PDE5 is a specific phosphodiesterase, found at high concentration in the penile tissues, which is responsible for breaking down cGMP

What are the most common side effects of PDE5 inhibitors ?

- Most due to cross-reactivity of the drug with other phosphodiesterase isoforms in other parts of the body
- Headache, congestion, dyspepsia, facial flushing, back pain, and visual disturbances
- Severe side effects such as vision loss from Non-arteritic Ischemic Optic Neuritis (NAION) or cardiac events have been reported

What are contraindications to the use of PDE5 inhibitors?

- Patients taking nitrates
- Within 4 hours of alpha-blocker
- Men with moderate to severe liver insufficiency or severe renal insufficiency should use lower doses due to impairment of drug metabolism
- Unstable angina or angina on sexual intercourse

What are some ways to optimize the efficacy of PDE5 inhibitors ?

- Sildenafil and vardenafil should be taken no less than 1 hour before planned sexual activity
- Tadalafil should be taken up to 2 hours before planned sexual activity
- Patients should be instructed that the medication augments but does not cause penile erection
- Sexual stimulation is required for these drugs to work
- Sildenafil and vardenafil should not be taken after a high-fat meal, as this will slow absorption of the drug.

- To date, no data are available from double- or triple-blind multicentre studies comparing the efficacy and/or patient preference for sildenafil, tadalafil, vardenafil, and avanafil
- Choice of drug will depend on the frequency of intercourse (occasional use or regular therapy)

Characteristics of PDE5I's

| | <i>Sildenafil</i> | <i>Vardenafil</i> | <i>Tadalafil</i> |
|---------------------------|--|---|--|
| Onset of action | 15 min to 1 hour | 15 min to 1 hour | 15 min to 2 hours |
| Half-life | 3–5 hours | 4–5 hours | 17.5 hours |
| Bioavailability | 40% | 15% | Not tested |
| Effect of food | Reduced absorption with fatty foods | Reduced absorption with fatty foods | None |
| Dosages | 25, 50, 100 mg | 5, 10, 20 mg | 5, 10, 20 mg |
| Side-effects | Headache, dyspepsia, facial flushing, blurred/blue vision, rare cases of backache, myalgia | Headache, dyspepsia, facial flushing, rare cases of backache, myalgia and blurred/blue vision | Headache, dyspepsia, facial flushing, backache, myalgia, rare cases of blurred/blue vision |
| Contra-indications | Nitrates | Nitrates, anti-arrhythmics | Nitrates |

Vaccum erection devices

- Erections satisfactory for intercourse, is as high as 90%, regardless of the cause of ED and satisfaction rates range between 27% and 94%
- The commonest adverse events include pain, inability to ejaculate, petechiae, bruising, and numbness, which occur in < 30% of patients
- VEDs are contraindicated in patients with bleeding disorders or on anticoagulant therapy

2nd line therapy

- Intracavernous injections
- Intraurethral/topical

Which drugs are most commonly used alone or in combination for intracavernosal pharmacologic injection therapy for ED?

- Prostaglandin E1, phentolamine (an alpha-blocker), and papaverine (a nonselective phosphodiesterase inhibitor)
- Prostaglandin is the only one of these that is FDA approved

Intracavernous Pharmacotherapies

| TRADE NAME | DRUG | DOSAGES | EFFICACY (INTERCOURSE) |
|-----------------------------|---|---------------------------------------|---------------------------|
| Caverject | Alprostadil (Prostin VR) | 5-40 µg/mL | ≈70% |
| Edex | Alprostadil (Prostin VR) | 5-40 µg/mL | ≈70% |
| Bi-mix | Alprostadil + phentolamine | 20 µg/mL + 0.5 mg/mL | ≈90% |
| Bi-mix Androskat (EU) | Papaverine + phentolamine | 30 mg/mL + 0.5 mg/mL | ≈90% |
| Tri-mix | Alprostadil + papaverine + phentolamine | 10 µg/mL + 30/mg/mL + 1.0 mg/mL | ≈90% |
| Invicorp | VIP + phentolamine | NA | ≈80% |
| Thymoxamine | Moxisylyte | NA | ≈70% |

What are the risks/side effects of intracavernosal injection therapy for ED?

- Bleeding, pain, and infection are minor side effects that can be obviated with instruction of a good injection technique
- Priapism and corporal fibrosis are more serious complications

What is MUSE™? How is it administered?

- MUSE (medicated urethral suppository for erections) is prostaglandin E1 in a small pellet form for intraurethral placement

What are the side effects of MUSE™?

- Urethral burning and pain are the most common side effects of MUSE™

Third-line therapy (penile prostheses)

- Prostheses may be malleable or semi-rigid rods, 2-piece inflatable devices or 3-piece inflatable models
- Malleable and semi-rigid devices are easy to operate and have a low risk of failure
- Inflatable devices produce a more natural fl accid appearance to the penis and permit some expansion with inflation but with higher failure rate

What are the potential complications of penile prosthesis placement?

- Penile pain, damage to adjacent structures (bladder, urethra, and vascular structures), penile foreshortening, and infection

What is the penile prosthesis SST deformity and how is it corrected?

- Downward bowing of the glans after penile prosthesis implantation is called the SST deformity
- Surgical options for correction include redilating the corpora and resizing the device or glans fixation over the device tip

Which patients are at highest risk of penile prosthesis infection?

- Diabetics & immunocompromised
- Patients with spinal cord injury
- Repeat implant operations and surgical revisions
- Copious irrigation with antibiotic solutions is recommended during revision/replacement procedures

Recommendations for the treatment of ED

| | LE | GR |
|---|----|----|
| Lifestyle changes and risk factor modification must precede or accompany ED treatment. | 1a | A |
| Pro-erectile treatments have to be given at the earliest opportunity after RP. | 1b | A |
| When a curable cause of ED is found, it must be treated first. | 1b | B |
| PDE5Is are first-line therapy. | 1a | A |
| Inadequate/incorrect prescription and poor patient education are the main causes of a lack of response to PDE5Is. | 3 | B |
| A VED can be used in patients with a stable relationship. | 4 | C |
| Intracavernous injection is second-line therapy. | 1b | B |
| Penile implant is third-line therapy. | 4 | C |

Thank
You