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Renal disease in the elderly – a new entity?

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Chronic renal disease (CRD) in adults is fairly common worldwide. CRD is often associated with cardiovascular mortality, which is increasing. In adults CRD is associated with systemic hypertension, diabetes mellitus and systemic lupus erythematosus (SLE) or glomerulonephritis (GN).[1,2]

Globally, there is an increasing tendency for patients to reach end-stage renal disease (ESRD). The diagnosis of CRD and ESRD is based on the estimated glomerular filtration rate (eGFR). In the West the population is ageing, e.g. in the USA the elderly will outnumber children within 10 years. Currently, life expectancy for men in Europe is 76.1 years and for women 82.2 years.[3,4] Although the incidence of ESRD is high in the elderly, progression to renal failure tends to be low.[3]

The Kidney Disease Outcome Quality Initiative (KDOQI) classification system is based on the reduction of the GFR. The fixed cut-off for abnormalities used in the classification system is for all ages and age-related renal function decline has been omitted.[3] In the elderly it is important to keep in mind that age-related changes occur in the kidney. With ageing there is a gradual structural and functional loss, starting around the age of 40 years, with a decrease in the GFR of 8 ml/min/decade.[3]

The histological changes that are found in the kidneys of the elderly are a gradual increase in glomerulosclerosis, interstitial fibrosis, tubular atrophy and chronic vascular disease, which is also known as nephrosclerosis. Age-associated changes may, however, also occur with systemic hypertension and diabetes mellitus.[3]

The presence of CRD in the elderly is increasingly recognised (KDOQI and National Kidney Foundation (NKF)), but staging of the CRD is also important. If the renal disease is recognised earlier, treatment can be improved with a focus on preventing progression.[4] The more advanced stages of CRD have a poor overall outcome, associated with increased mortality risk and hospitalisation.[5]

In the elderly it is important to establish whether there is progression to renal failure. Decline in renal function with ageing is physiological and not pathological. This must be taken into account before an elderly patient is labelled as having CRD.[5] However, if the eGFR is below 60 ml/min, even in the elderly, renal disease must be evaluated and managed.[5]

In the elderly there is seldom a single cause for CRD. They often have hypertension and/or diabetes, which is associated with ESRD. Sudden progression of decreased renal function is associated with infections, vasculitic symptoms or changes in medication.[5]

Primary glomerulopathies and vasculitis tend to be increasingly recognised in the elderly and must be included in the differential diagnosis of a patient with progression of renal disease. A renal biopsy may be required.[5,6] A renal biopsy is regarded as the gold standard in the evaluation/investigation of a patient with renal disease. It provides the diagnosis, and guides treatment and prognosis.[6]

Requesting a renal biopsy in the elderly is problematic, because the biopsy may reveal only age-related changes.[6] In the subgroup of patients over the age of 80 this is even more problematic. In this subgroup, however, properly indicated biopsies are almost always worthwhile, because the biopsy provides a diagnosis with therapy options and a prognosis and often prevents the patient receiving unnecessary therapy.[6]

It is important to remember that kidney diseases in adults and in the elderly overlap. A few types of glomerulopathy are more common in the elderly. Membranous and minimal-change glomerulonephritis is more common in the elderly, while other GNs tend to occur in younger adults. SLE renal involvement occurs exclusively in young adults.[6]

Tubulo-interstitial nephritis tends to occur in the elderly owing to age-related changes or the toxic effect of medication.

In the elderly there are some diseases that are more frequent and that require renal biopsy and careful evaluation in order to be excluded.[6]

These diseases include:

- crescentic glomerulonephritis due to ANCA-positive vasculitis
- amyloidosis/myeloma cast nephropathy due to paraproteins from plasma cell dyscrasias or lymphoplasmacytic proliferations
- atherosclerotic/athero-embolic renal disease.

Unfortunately, the elderly person with ESRD has a higher risk of frailty, an increase in syncope and a decrease in memory/increase in dementia. Life expectancy varies between 8.9 and 24 months. These risks may be aggravated by dialysis.[7]

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An overview of catheters and collection devices in urology

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Definition of incontinence

Incontinence can be defined as the involuntary loss of urine and faeces. Usually the time and place for urination or defecation cannot be controlled, and the person is forced to pass urine or stool.

Collection devices

Urinary sheaths/condom catheters

- We are moving away from sheaths/catheters containing latex to sheaths or catheters containing 100% silicone.
- Urinary sheaths are attached to the outside of the penis shaft and can be self-adhesive or contain a uriliner for attachment to the penis shaft.
- Sheaths differ in size from 25 mm to 40 mm.
- The patient needs to be evaluated thoroughly for penis size because if the condom/sheath fits too tightly it will cause ulcers on the penis shaft or if it fits to loosely it will fall off.
- When ulceration occurs, the patient needs to stop using the urinary sheath and an alternative option should be considered for managing the urinary incontinence.

Penile clamps

- These are very effective for very active male patients.
- When evaluating the patient for a penile clamp, the manufacturing instructions should be followed carefully to prevent restriction of blood flow to the penis as well as ulceration.

Absorbent products

- Absorbent products are manufactured for urinary and faecal incontinence and contain super-absorbent material (SAM).
- There is a wide variety available comprising pads, diapers and pull-up pants.
- Different sizes are available and patients need to be evaluated for amount of urine requirements and appropriate size.
- Evaluate patients for ulceration of the healthy skin and consider referring for barrier cream or film.

Underwear

It is important for underwear to:

- Be easy to remove and contain fasteners
- Contain the smell
- Absorb small amounts of urine.

Protective linen

Protective linen includes absorbent linen savers and washable mattress protectors.

Urinary catheters

- Urinary catheters should be considered as the last option for managing urinary incontinence.
- For long-term catheterisation consider a 100% silicone catheter with the correct balloon size.
- Catheters should be changed regularly by competent personnel.
- Catheters should always be stabilised and if long-term catheterisation is considered; refer the patient to a urologist for a suprapubic catheter.
- Patients should be evaluated after catheterisation for the correct collection bag, e.g. a night bag for large volumes of urine during the night, and a leg bag for during the day, which is enclosed underneath clothing.

Self-intermittent catheterisation

Patients are usually referred for self-intermittent catheterisation to control the leakage of urine in overflow incontinence when the bladder residual is more than 80 ml. Another reason would be to teach a patient with a urethral stricture to catheterise thim/herself to keep the stricture open and to prevent urinary retention. It may also be necessary for any post-urology or gynaecological procedures.

High bowel washouts or retrograde colonic lavage technique (RCLT) for faecal incontinence

The principles of RCLT include:

- An empty colon cannot soil.
- The colon is a capable reservoir.
- It only needs to be emptied at long regular intervals, e.g. every 24 hours.
- The colon can be programmed to empty itself at a set time, with or without assistance.
- A natural gastrocolonic reflex aids programming of the colon.

Bowel irrigation offers the following advantages:

- More freedom and security.
- Time and place of bowel movement can be determined.
- Method is easy to learn and can be performed without mess or discomfort.
- It is cost-effective as there is no need for suppositories, enemas and added medication.
- There are no haemorrhoids or trauma to the rectum as a result of damage to blood vessels while 'gloving'.

Requirements for bowel irrigation include:

- The patient must be well motivated and understand the advantages.
- The patient must be able to 'transfer' to the commode or toilet for the procedure.
- Dedicated caregivers are needed for quadriplegics and tetraplegics.

The following are contra-indications for bowel irrigation:

- Diseases of the bowel or existing irritable bowel
- Senility or mental deficiency
- Inability to reach the anus and hold the cone in place, e.g. obesity.

Sperm retrieval techniques and cryopreservation in men with spinal cord injury

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Men with spinal cord injury (SCI) have several problems with regard to fertility and conception.

The extent of these problems falls outside the scope of this article, but can include:

- Problems with ejaculation due to interruption of sympathetic, para-sympathetic and somatic nerves during the SCI. In a large study it was shown that only 15% of men with all types of SCI ejaculate normally.[1]
- Abnormal sperm parameters including low sperm count[2] and especially low sperm motility.[3]

The availability and development of sperm retrieval techniques and cryopreservation have improved the chances of conception in men with SCI. A few of these techniques are discussed here, but much more detail is available in the literature.[4]

Sperm retrieval techniques

Non-surgical sperm recovery

Pharmaceutical agents

The first pharmaceutical agents used to induce spontaneous ejaculation in men with SCI were cholinesterase inhibitors.[5]These drugs had a success rate of about 58% but also had severe side-effects, including autonomic dysreflexia (AD), cerebral haemorrhage and death. Another drug, the alpha-1 agonist midodrine, can be used orally and has shown promise in the treatment of anejaculation and retrograde ejaculation and has a lower incidence of AD.[6]

Prostate massage

Several authors have reported efficient retrieval of sperm by rigorous prostatic massage with the male in the lateral decubitus position.[7]

Penile vibratory stimulation (PVS)

This technique has been used since 1965 but was later refined by Brindley.[8] A hand-held vibrator is held against the dorsum of the glans penis or the frenulum of the penis. The mechanical stimulation activates afferent fibres in the dorsal nerve of the penis and subsequently leads to ejaculation.[9]

To decrease the incidence of AD, the patient receives oral nifedipine and/or sublingual nitro-glycerine before starting the procedure. If the patient has a history of retrograde ejaculation, it is necessary to prepare the bladder by emptying it and installing a buffer appropriate for spermatozoa washing before starting the procedure.[10] Alkalinisation of the urine needs to start at least 48 hours before the PVS session. During the session it is important to monitor the patient's blood pressure (BP) continuously and terminate the procedure if the BP rises to a dangerously high level. Somatic responses such as contraction of the abdominal muscles, or knee or hip flexion indicate that either antegrade or retrograde ejaculation has taken place.[4] If there is no antegrade ejaculation or there are low volumes of antegrade ejaculation, bladder washings should be done to retrieve viable sperm. The overall success rate of PVS is between 49% and 54% if injuries below T10 are excluded.[11]

Electro-ejaculation

This technique was initially described by Learmonth in 1931[12] and is said to produce successful ejaculation after 15 - 35 stimulations of the anterior rectal wall.[13]Before the start of the procedure, the bladder is emptied and buffer solution installed to protect the sperm in the case of retrograde ejaculation. If the patient has preserved sensation of the rectum, spinal or epidural analgesia will be needed and precautions must be taken to protect the patient in case of AD. The success rate of electro-ejaculation may range from 63% (patients with upper motor neuron lesions) to 93% (patients with lower motor neuron lesions).[14] Some investigators have shown that electro-ejaculation may affect sperm motility and that PVS is a better method for preserving sperm motility.[15]

Surgical techniques for sperm retrieval

If assisted ejaculation procedures fail to produce motile and/or viable sperm for *in vitro* fertilisation, several surgical techniques can be employed to retrieve sperm. These procedures can be done percutaneously or during open surgical procedures. The complete description of these techniques falls outside the scope of this article, but readers are referred to an excellent review by Schlegel.[16]

Percutaneous techniques

There are several successful techniques that may be used under local or general anaesthesia. These techniques include percutaneous epididymal sperm aspiration (PESA), percutaneous testicular sperm aspiration (TFNA) and percutaneous testis biopsy.

Open surgical sperm retrieval

Open microsurgical techniques are used to retrieve sperm from the testis or epididymis. The two best-known techniques are microsurgical epididymal sperm aspiration (MESA) and testicular sperm extraction (TESE).

Cryopreservation of sperm

After retrieval, cryopreserved sperm can be stored for long periods and still be used successfully. There are different techniques for cryopreservation of sperm.[17]

Freezing

Cryoprotectants such as glycerol and sucrose or other saccharides are added to sperm. Thereafter sperm can be frozen using slow programmable freezing or a new flash-freezing technique called vitrification.[18]

Thawing

Thawing of sperm at 40°C has minimal effect on sperm viability and DNA quality.[19]

More information about cryopreservation can be found on the website of the South West Centre for Reproductive Medicine at: www.plymouthhospitals.nhs.uk. More information about sperm banking and available sperm banks in South Africa can be obtained at the following website: http://www.giftovlife.com

References available at www.cmej.org.za