Sexual function and end stage renal failure

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Objectives

- Review normal sexual function
- Review altered sexual function associated with renal failure
- Review investigations for causes of sexual dysfunction in renal failure
- Review treatment of sexual dysfunction in renal failure
- Discuss the role of renal health care professionals in assisting people with ESRF to cope with associated sexual dysfunction

Learning Outcomes

Discuss normal & altered sexual function

Apply knowledge of sexual dysfunction in practice including:

- Sensitively support the patient with issues of sexual dysfunction
- Apply principles of therapy monitoring and dialysis adequacy to increase chances of improving patients' sexual function
- Assist patients with problems of sexual function to seek expert help

"Love and desire are the spirit's wings to great deeds" (Johann Wolfgang von Goethe)

Introduction

Sexual dysfunction is complex with a mix of physiological and psychosocial factors involved. There is a considerable body of literature about sexual dysfunction, its causes, and methods available to improve function. Problems relating to sexual function have been reported at rates as high as 70% amongst people with end stage renal failure (ESRF), with rates almost equal for men and women (Ayub & Fletcher 2000). Among men, 50% report erectile dysfunction while both men and women report a loss of libido and a decline in the frequency of intercourse (Palmer 1999; Steele et al 1996). Given the importance of sexuality in identity for many, sexual dysfunction is an important change that many patients contend with. Depression associated with both sexual dysfunction and lifestyle restrictions due to uraemia is common (Auer 2002; Cukor et al 2007; Palmer 1999).

Sexuality is not a topic that patients or staff raise or discuss frequently. This may or may not be associated with factors such as the gender and age of patients or staff and the environment of the renal or dialysis unit. Discussion of sexuality amongst renal professionals can help raise awareness of and increase insight into this issue that affects many people living with ESRF.

Physiology of Sexual Function

In both men and women, fertility and sexual function are governed by complex hormonal systems – and a key element of this is the production and regulation of luteinizing hormone (LH) and follicle-stimulating hormone (FSH). A key side effect of renal failure is its effect on the regulation of these hormone levels and how this disturbs background 'normal' levels of testosterone in men and the menstrual cycle in women (Palmer 1999).

In addition to interference with this cycle, chronic renal failure in men may result in damage to the testes, problems with impaired erectile function, and complications due to medication. For women, amenorrhea or hypermenorragia are possibilities along with decreased libido and reduced ability to reach orgasm (Palmer 1999).

Men

The male reproductive system is comprised of two main elements; essential organs (gonads) for production of gametes and supporting accessory organs (penis), for transporting gametes to their destination (Anthony & Thibodeau 1979).

The male gonads (testes) produce sperm from their seminiferous tubules, and within the testes Sertoli cells assist in sperm maturation whilst Leydig cells secrete testosterone. Testosterone secretion is part of a feedback mechanism involving the anterior pituitary gland (see figure 1). The anterior pituitary gland secretes luteinizing hormone (LH), which in turn stimulates the testes' interstitial (Leydig) cells to develop and secrete testosterone; the rise in testosterone causes a feedback mechanism to inhibit the production of LH (Anthony & Thibodeau 1979; Palmer 1999). Testosterone promotes development of 'maleness' and helps regulate various parts of metabolism including protein, bone, fluid and electrolytes. In addition to the physical expressions of maleness, testosterone can influence and 'colour' behaviour, as common humour and anecdote illustrate. Individual levels of testosterone, like many hormones, also affect subjective perceptions and identity.

In order for reproduction to occur sperm must move from the male to a fertile female body. This is achieved through sexual stimulation causing an increased arterial flow to the penis, which in turn blocks venous outflow and allows engorgement of the penis with blood filling the cavernous spaces. The resultant stiffening facilitates intercourse, which results in ejaculation,

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allowing the sperm to be deposited within the female reproductive tract (Anthony & Thibodeau 1979).

Women

Women also have essential sex organs or gonads: the ovaries, and accessory organs; fallopian tubes, uterus, vagina, vulva and breasts. The functions of ovaries are to produce and develop ova (gametes) and to secrete the hormones oestrogen and progesterone. The accessory organs allow movement of gametes to facilitate fertilisation, provide a safe physiological environment for development of new life, and allow birth and subsequent nourishment of the infant (Anthony & Thibodeau 1979). As with men, women's reproduction is controlled by hormonal activity, from the hypothalamus, the anterior pituitary gland and the ovaries (Palmer 1999).

Ovulation, the release of an ovum by the ovary, is the most important event of the fertile cycle. The ovulatory mechanism also produces the two hormones, oestrogen and progesterone. Oestrogen stimulates growth of the endometrium lining the uterus. After ovulation, progesterone and oestrogen are produced by the corpus luteum, which forms from the ruptured follicle. Progesterone prepares the oestrogen-primed endometrium for implantation of the fertilized ovum. In the absence of pregnancy, production of oestrogen and progesterone begins to decline approximately 7 days after ovulation and this results in shedding of the endometrium as menstrual bleeding 11-16 days after ovulation.

The secretion of two hormones by the anterior pituitary gland, follicle-stimulating hormone (FSH) and luteinizing hormone (LH), controls the cyclic changes in ovarian activity through feedback (see figure 2). Production of these hormones is controlled in turn by the hypothalamus (Palmer 1999). Women also produce testosterone, from the adrenal glands and ovaries, however the amount produced is less than a seventh of that produced by men. Testosterone is associated with bone density, muscle mass and libido in women as in men.

Beyond reproduction, sexual activity for many is part of their identity and is an important component of many long-term partner relationships. Anecdotal evidence also suggests that besides motivation to reproduce, humans may also pursue sexual intercourse as a means to achieve transitory physical pleasure, either with or without attendant emotional gain.

Sexual Function and ESRF

Men

Impotence, or erectile dysfunction (ED), is reported to be the commonest sexual dysfunction complaint amongst men with renal failure (Palmer 1999). The causes of ED may be due to endocrine abnormalities, nervous or vascular system problems, medication related or psychological in origin. Sometimes a combination of causative factors will develop. At times discussion of causation falls into a chicken or egg debate as the dominance of physiological and psychological factors are discussed.

The classic question is whether the development of physical symptoms of renal-related sexual dysfunction leads to psychological stress and depression or whether depression and psychological factors related to renal-related lifestyle constraints gives rise to development of sexual dysfunction. This is debated in the literature without conclusion being drawn (Palmer 1999) although it is suggested that a sexual response cycle dependent on all possible (factors) causes may explain sexual dysfunction in renal failure (Ayub & Fletcher 2000).

Infertility may result from inefficient or insufficient sperm production and testicular damage with reduced testosterone secretion (Flanigan & Lim 2007). The Leydig and Sertoli cells often appear normal, a possible indicator of hormonal or endocrine imbalance rather than uraemic toxins interrupting functions of these cells (Palmer 1999). Reduced testosterone level results from decreased hormone function in the testes, and thus there is no feedback mechanism and LH rises. This rise is worsened due to the decreased renal clearance of LH (Palmer 1999).

Women

Much of the literature covering sexual dysfunction in chronic renal failure appears to focus primarily on the effects on men's sexual function with little detail regarding women's sexual issues. In a literature review on sexual dysfunction in hemodialysis patients Stewart (2006) identified 31 studies, of which 90% included male subjects and 55% only had male subjects. These figures are interesting given that there is an acceptance in the published literature that the majority of women with renal failure will experience menstrual cycle disruption, fertility problems and diminished sexual drive (Cohen et al 2007; Flanigan & Lim 2007; Palmer 1999; Hurst 2002).

Menstrual disturbance can range from amenorrhea to hypermenorragia, the latter contributing to anaemia. Women with renal failure have also reported reduced libido (Palmer 1999; Hurst 2002) although several studies have highlighted that this appears to be less problematic for women than men (Steele et al 1996; Toorians et al 1997).

Investigating Sexual Dysfunction in ESRF

The chief aim of investigating male problems is to determine whether ED is a feature and the specific causes (e.g. endocrine, neurogenic, vascular or psychological) (Palmer 1999). Endocrine investigations may include testosterone, luteinizing hormone and prolactin levels. Neurogenic and vascular causes can be differentiated by Doppler studies to detect penile arterial insufficiency or a corpus cavernosagram (see anecdotal case study) to detect venous leak.

Investigation of women's sexual dysfunction centres on endocrine testing to determine whether the woman ovulates. Anovulation may be associated with low progesterone levels, elevated prolactin and absence of rises in LH and oestradiol (Palmer 1999).

Treating Sexual Dysfunction in ESRF

Algorithms have been developed to assist in the treatment of both men and women with sexual dysfunction and renal failure (Palmer 1999). In both cases the algorithms commence with good history taking, physical examination, optimisation of dialysis, haemopoietic therapy, treatment of hyperparathyroidism and a medication review (Palmer 1999). Correction of anaemia by erythropoietin has been associated with "normalization of the

pituitary gonadal feedback mechanism" (Palmer 1999). For men treatment of psychological causes of ED is suggested next, with contemporary literature showing the main treatment for men following optimisation of all other aspects of health, is Sildenafil (Viagra) administration (Ayub & Fletcher 2000; Palmer 1999). Although Sildenafil has been shown as efficacious for a large percentage of men with ED it does not appear to have an effect on decreased libido (Seibel et al 2002).

In women, hormonal problems associated with anovulation may be treated with progesterone whilst oestrogen therapy may help with the decreased libido associated with vaginal dryness and atrophy (Palmer 1999). It is also recommended that regular gynaecological monitoring be undertaken to detect any early signs of endometrial hyperplasia or carcinoma (Palmer 1999).

The issue of fertility for women with ESRF could consume an entire discussion on its own. Generally the recommendation is for contraception to be advised for women who may be fertile (Palmer 1999). This advice appears to be largely due to the difficulties of achieving successful pregnancy outcomes rather than the problems of ensuring optimal health for the women themselves (Hou & Grossman). Unfortunately, this advice does not account for the personal wishes of individuals, thus psychological support will be an important facet of caring for any woman with ERSF who is faced with fertility issues.

Role of the Health Professional

It appears that the majority of patients who report sexual dysfunction reveal this most often to their nephrologist rather than nephrology nurses (Stewart 2006). Gender issues and the sensitive nature of the problem may be the cause of many patients' reticence to discuss the subject with nurses. Equally it may be connected with the sense of familiarity and "family" that many patients and nurses establish, which can act as a bar to such sensitive discussions. In addition the open environment of many dialysis units may not be conducive for sensitive discussion.

Our nephrology colleagues in the United States are directed by their professional association standards to ensure patients express "satisfaction with sexuality" (Stewart 2006). How nurses can go about discovering whether patients are satisfied is problematic. In a recent straw poll of colleagues I have discovered that I am like the majority; having never been approached by a patient about sexual problems and having never opened the topic myself. Only a small minority noted patients ever talking about problems and these were limited to brief comments from men who were already being treated by their nephrologists for ED. Our CKD nurse educator noted that some of the educational material made available to patients covers sexual problems but that very few had been willing to openly discuss the subject either at group education seminars or at one-to-one appointments (See suggested readings for list of patient education literature). It is her belief that there are so many other issues the newly diagnosed patient must face that sexual problems are not shown to be a high priority by many (Shelverton 2009 personal communication).

The intention of this article is not to provide a how-to manual. Rather, the hope is that this complex and sensitive topic might be raised amongst nephrology staff. Perhaps more open discussion of the topic will allow sharing of knowledge by the (probably) few who are well versed in dealing with sexual dysfunction amongst our patient population. With more sharing of our limited pool of knowledge we may become more alert to signs of possible distress caused by the myriad problems associated with sexual dysfunction and thereby feel better able to discuss the topic with patients.

Questions and Activities

The following questions (Q) and activities (A) are designed to encourage further, independent learning. Answer them on your own, or discuss with colleagues.

Q: Explore why correcting factors such as anaemia and hyperparathyroidism may improve sexual function.

Q: Debate with colleagues the role of contraception in ESRF.

A: Investigate your unit's approach to patient education about sexual function and ESRF.

A: Find out how successful transplantation affects sexual dysfunction.

Q: What are the main contraindications to Sildenafil use?

A: Initiate a discussion with your colleagues to gauge how often this delicate subject occurs with patients in your care.

"Love is not love that alters when it alteration finds" (William Shakespeare)

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Table 1: Investigating and Treating Sexual Dysfunction in All Patients with ESRF. Adapted from Palmer (1999)

All Patients
Medical History
Physical Examination
Optimize Dialysis
Medication Review
Treat Anaemia = Erythropoietics,
Treat Hyperparathyroidism = Vitamin D

Table 2: Investigating Sexual Dysfunction in Men with ESRF. Adapted from Palmer (1999)

↓ Libido with Normal Erectile Function
Psychosocial Investigation & Support
Endocrine Evaluation
↑ Prolactin with ↓ Testosterone
Bromocriptine Trial
No response = Testosterone Trial
Normal Prolactin with ↓ Testosterone = Testosterone Trial
Erectile Dysfunction
Investigate cause (organic vs. psychogenic)
Psychosocial Investigation & Support
Sildenafil Trial
If no response = Endocrine Evaluation as above
Neurogenic vs. Vascular Investigation
Vacuum Device
Intracavernous Injection (PgE1)
Urethral Suppository (PgE1)
Penile Prosthetic Surgery

Table 3: Investigating and Treating Sexual Dysfunction in Women with ESRF. Adapted from Palmer (1999)

Oligomenorrhoea or Amenorrhoea
Regular Gynaecological Review
Exogenous Progesterone
Regular Menses
Family Planning / Birth Control Counselling / Multidisciplinary Management of Pregnancy
Decreased Libido
Psychosocial Investigation & Support
Endocrine Evaluation
↓ Oestradiol
↑ Prolactin = Bromocriptine Trial
If no response = Oestrogen Therapy Trial

Fig 1: Feedback Mechanism for Male Reproductive Hormones. Adapted from Palmer (1999) and Anthony & Thibodeau (1979).

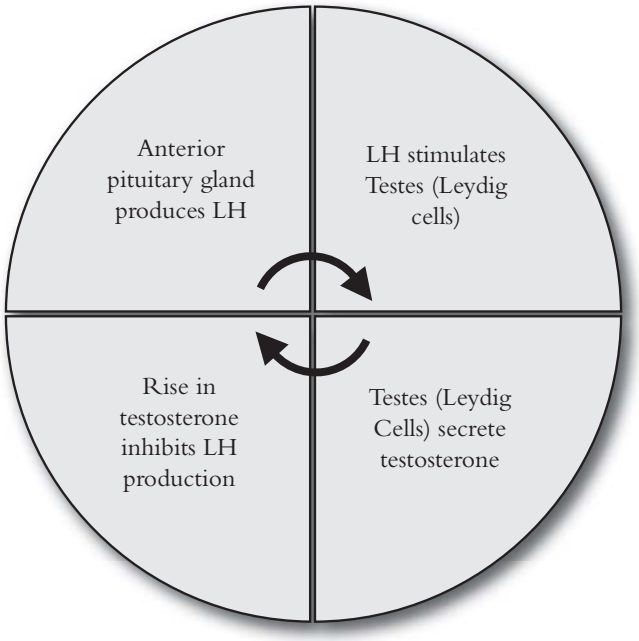
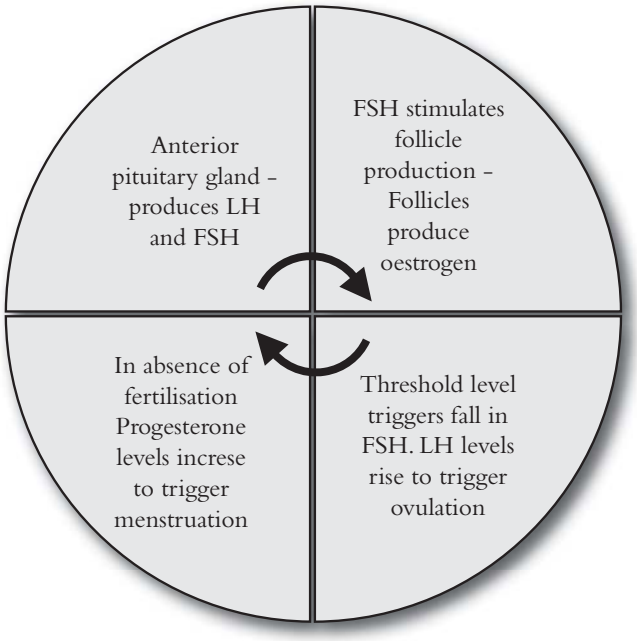


Fig 2: Feedback Mechanism for Female Reproductive Hormones. Adapted from Palmer (1999) and Anthony & Thibodeau (1979).



Patient Resources are available from the Renal Resource Centre: <http://www.renalresource.com/>
and Kidney Health Australia: <http://www.kidney.org.au/ForPatients/HealthPublications/tabid/618/Default.aspx>