Gynecology & Obstetrics

Lleberia et al., Gynecol Obstet 2013, 3:4
http://dx.doi.org/10.4172/2161-0932.1000166

Review Article Open Access

# De Novo Urgency: A Review of the Literature

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**Summary**

De novo urgency can be defined as the appearance of urge urinary incontinence after an anti-incontinence surgery that persists after six months. This term can only be used when the patient did not have any urgency preoperative symptoms. The incidence of de novo urgency varies between 3.1% and 25.9% and although its pathophysiology is unclear, it is suggested that an obstruction (absolute or relative) is caused during the procedure that induces a reaction in the detrussor muscle. The evaluation of de novo urgency includes a thorough anamnesis, physical examination, residual urine evaluation, urinalysis, and urodynamic testing. When there is evidence of a bladder outlet obstruction, its treatment is urethrolysis or urethral dilatation. For patients without obstruction, a more conservative approach including pelvic floor exercises and antimuscarinics is recommended. A meticulous surgical technique is the key to try preventing this pathology. As excellent practise for incontinence techniques cannot prevent all cases must continue deepen their study of anatomical and functional factors.

**Keywords:** De novo urgency; Tape complications; Physiopatologhy

## Introduction

Pelvic floor muscle training is the first therapy option for stress incontinence with as close as to 50% efficacy [1]. In case of failure or when this therapy is not possible due to concomitant presence of Prolapse or limitations of the patient (physical or mental) the next step is, nowadays, anti-incontinence surgery such as tension-free vaginal tape [2-4]. Since the introduction of this technique in 1995, it has won popularity and is at present one of the most used methods for the treatment of stress incontinence in developed countries [5]. The reported success rates for this procedure are high, results reported at seventeen year's follow up indicate a 90% objective cure, however we will focus on one of its mid-long term complications: de novo urgency with or without incontinence [6-8].

Post-surgical follow up have reported that the incidence of the novo urgency varies between 3.1% and 25.9% [9-13]. Despite a lack of a generally agreed definition, according to the series it is clear that a prerequisite is that the patient had no urgency symptoms preoperatively. The term of the novo urgency implies the postoperative development of urge urinary incontinence (defined as the involuntary leakage from the urethra synchronous with the sensation of a sudden, compelling desire to void that is difficult to defer) and its persistence after six months [14,15].

## Pathophysiology

The etiology and mechanisms for the development of de novo urgency are unclear. However it is suggested that, as it is related to a surgical urethral sphincter support, a bladder outlet obstruction (absolute or relative) causes changes in the voiding function which are responsible of the onset of the symptoms [16]. Generally, it has been shown that women with bladder outlet obstruction present a higher grade of detrussor over activity than women without it. Furthermore, both Pope and Cardozo research studies have demonstrated that anti-incontinence surgery results in an increased urethral resistance during micturition [17-20]. Because detrussor pressure generated during voiding is largely dependent on outflow resistance, one would expect that an increase in urethral resistance should be met by an increase in detrussor pressure. By 12 months post surgery, mean void pressure in these women increased from 26 ± 8 cm $H_2O$ to 57 ± 11 cm $H_2O$, average flow rates diminished and urethral resistance increased [17]. From these results it was concluded that the establishment of some degree of urethral obstruction (with or without overactive bladder symptoms) is inevitable in the process of restoring continence [19]. Moreover, there was no change in urethral resistance in those patients whose surgery failed [18]. Bombier et al. performed a postoperative bladder neck position and urethral compression evaluation using magnetic resonance that demonstrated bladder neck elevation and urethral compression to be associated with detrussor over activity [16]. Bump et al. described the key to successful anti-incontinence surgery as the establishment of optimal dynamic obstruction [20].

Although bladder outlet obstruction has commonly been used as one explanation for the novo urgency; in some patients no evidence obstruction has been detected. Therefore, it is logical to postulate alternative mechanisms for the development of this symptomatology. Falconer et al. performed a two year follow-up of Tension-free Vaginal Tape (TVT) and observed an increase of paraurethral connective tissue metabolism which was more pronounced in postmenopausal women [21,22].

Other authors suggest that damage on the autonomic innervation may be the onset of the syndrome. In vitro studies of detrussor smooth muscle from patients and animal models with detrussor over activity have revealed changes in physiologic properties consistent with denervation and supersensivity [23]. Moreover, it has been found that postoperative dysfunctional voiding may occur due to altered innervations patterns to the pelvic floor [24]. Additionally, the incidence of postoperative the novo urgency is similar in current sling procedures and in classical abdominal operations [16,25,26]. Indeed, it has been suggested that detrussor over activity may have been caused by the damage inflicted on the autonomic innervation of the bladder by surgical dissection [9]. Therefore, a history of caesarean section could be considered as a risk factor for developing de novo urgency and undergoing a hysterectomy could worsen its symptoms [27].

Nevertheless, the majority of anti-incontinence procedures such as

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**Received** July 31, 2013; **Accepted** August 26, 2013; **Published** August 28, 2013

**Citation:** Lleberia J, Pubill J, Mestre M, Aguiló O, Serra L, et al. (2013) De Novo Urgency: A Review of the Literature. Gynecol Obstet 3: 166. doi:10.4172/2161-0932.1000166

TVT, are not at all related to dissection, most patients do not show evidence of obstruction nor have they undergone any gynaecological surgery, hence the logical hypothesis that there are important unknown etiological factors for de novo urgency and its multifactorial etiology [8].

## Symptoms

De novo urgency is the onset of urgency with or without leakage of urine after surgery that persists after six months. Irritative symptoms after surgery may be due to bladder adaptation to new urethral pressures and should not be diagnosed as de novo urgency. It is the symptoms persistence what defines this condition and even more important is how it diminishes the patient quality of life on the long-term.

One can understand that even after successful results curing stress incontinence a patient will be disappointment when one incontinence type transforms into the other. In general, the immediate and irresistible drive to micturate, nocturnal enuresis and pain make urgency a more bothersome condition than stress incontinence. The anamnesis should focus on these symptoms as well as symptoms that could suggest urine retention. The use of a disease-specific questionnaire such as ICIQ-SF, as well as a 3-day voiding diary will be helpful. Also, it is essential to know accurately the type of anti-incontinence procedure that the patient underwent [9].

## Physical Examination

A directed urogynecological and neurologic examination needs to be performed. Anterior vaginal wall is carefully examined with the help of a vaginal speculum paying close attention to the appearance of urethra and bladder neck. Scarification is also examined as it can give us information on an over tensioned tape whether because it is folded or too-tightly positioned. If that is unclear, urethra evaluation with a hyssop and Qtiptest can be useful. The presence of prolapse is also examined as it is suggested that there is an association between prolapse and urgency [28,29]. Then both vaginal and rectal digital exam must be performed and bulbocavernous reflex and perineal sensation assessed. Also, given the importance of differential diagnosis between urgency and urine retention any signs of said condition should be detected and an evaluation of post void residue performed either by catheterism or by perineal ultrasound.

## Clinical Exams

### Sediment - urine culture

The initial evaluation of any patient presenting urgency should include urine analysis to rule out occult infection or inflammatory condition. Thus, it would be appropriate to perform a dipstick urinalyisis with microscopy seeking for leucocytes and bacteria and also obtain a urine culture.

### Ultrasound

There are three ultrasonographic parameters that can be helpful in the differential diagnosis of de novo urgency: residual urine assessment, sling location and bladder wall thickness.

Is possible to determine if urgency symptoms are caused by chronic urine retention both performing a catheterism as well as an abdominal or vaginal ultrasound. Haylen et al. reported that the bladder volume can be calculated by the formula Volume = 5.9 × (height × depth) - 14.6 ml (95% confidence limits = ± 37 ml) [30]. Although there are other methods of measuring urine volume, this formula is currently the most used [31,32].

Ultrasonographic detection of the sling generally allows the assessment of its location. Indeed, several studies have reported data about specific distances to determine sling position [33-35]. It is logical that this information could be useful as a means of understanding the mechanism of postoperative bladder dysfunction. For instance, tapes can be located in the bladder or urethral lumen, or even when well located they can be too tightly pulled. Dietz et al. suggest that although position and mobility of the TVT vary markedly, variations in placement seem to have relatively little effect on symptoms. They only found association in case of over tensioned sling during valsalva and overactive bladder, urgency, increased frequency and bladder voiding dysfunctions [35,36].

The third sonographic parameter for the evaluation of this condition is bladder wall thickness evaluation. According to Latthe's last review (2010) [37], bladder wall thickness greater than 5 mm is useful in the diagnosis of overactive detrussor with a sensitivity between 40% and 84% and specificity between 78-89%. More recent studies have found a correlation between bladder wall thickness and urgency both clinical and urodynamic [38]. This evaluation can be logically suitable in cases of de novo urgency. Other exams such as magnetic resonance offer detailed pelvic anatomy iconography however the visualization of the sling is more difficult with this technique [39,40].

### Urodynamics

Urodynamic testing is an essential component of any evaluation of voiding dysfunction, and especially after anti-incontinence surgery. Given that obstruction may occur in the presence of normal emptying, a low post void residual in an initial evaluation should not falsely reassure the physician of the absence of obstruction. In cases of a certain and indubitable history of normal voiding before surgery and an unequivocal temporal relationship between surgery and the appearance of post void residual, urethrolysis can be performed immediately without the need of urodynamic testing however, most cases of bladder voiding dysfunction require it. A filling cystometrogram is an essential part of the urodynamic evaluation because patients with de novo urgency suffer from sensory urgency or detrussor overactivity alone or in combination. To determine the presence of detrussor overactivity one should carefully look for unstable detrussor contractions of any amplitude during the course of filling and attempt to obtain valsalva induced instability. As for sensory urgency, it is characterized by a reduction in cystometric capacity without a compliance loss or instability. Also, a filling curve for low bladder compliance may be observed which could indicate an increase of the bladder tone due to occult motor instability without uninhibited contractions of significant amplitude. Al Ghazo et al. studied the correlation between urgency symptoms and urodynamics findings in overactive bladder and concluded that 61.3% of patients who suffered urgency without leaking and 69.8% of patients with urge urinary incontinence presented overactive bladder in urodynamic evaluation. In addition, they found an association between the combination of nocturia and incontinence with overactive bladder [41].

### Cystoscopy

Cystoscopy is performed to rule out the presence of a foreign body into the bladder and it also allows the inspection of the bladder looking for any inflammatory changes indicative of chronic cystitis or occult neoplasm.

## Treatment

Treatment for the novo urge syndrome depends on the overall

symptoms of the patient combined with the most likely etiologic diagnosis objectively determined. Therefore, in the first place it should be decided whether the patient benefits from conservative treatment or if there is a bladder outlet obstruction that requires urethrolysis.

### Medical treatment

If the evaluation shows absence of obstruction one should start with conservative approach consisting of behavioural therapy combined with pharmacotherapy. It is generally recommended to start with a timed voiding schedule programme combined with limitations of excessive fluids and potential bladder irritants or diuretics such as caffeine or alcohol intake. Antimuscarinic therapy or adrenergic receptor beta 3 agonist therapy should be prescribed when there is urodynamic evidence of overactive bladder even in the presence of mild urine retention without significant post void residual. In case of failure or intolerance of antimuscarinic therapy one should proceed with current alternative therapies for urge urinary incontinence such as sacral or tibial neuromodulation or also the injection of botulinic toxin. These patients will indeed need a close follow-up to detect the development of occult urinary retention. In general, patients with urinary retention will eventually fail conservative therapy.

### Urethrolysis

Urethrolysis is the elective procedure for patients with symptomatic de novo urgency and evidence of obstruction. In these patients one should proceed with the loosening of the sling or with urethral dilatation. For patients with mild symptoms and minimal obstruction, urethrolysis will be performed after failure of conservative treatment with cure rates ranging between 65% and 92% although between 19% and 50% of these patients may develop recurrent stress urinary incontinence [9].

## Prevention

A meticulous surgical technique is the key to preventing obstruction. Urethral obstruction may occur if the sling is located too close to the urethra, or if it folds or buckle. In case of doubt, sonographic evaluation may be helpful in the early assessment (even intraoperatively) of sling location. Alternatively, in cases where a prolonged postoperative catheterism is needed one should determine the location of the tape and proceed to its immediate loosening if it is pulled too tightly.

The mechanism of action of tension-free vaginal tape procedure can be explained by a biomechanical model. Given that the biological reaction of the tape unpredictable, the only factor that can be controlled is the tension of the tape.

## Conclusions

The increasing use of tension-free tapes for the treatment of incontinence entails an increase of de novo urgency. Understanding the pathophysiological changes that occur in the vesicourethral function due to this procedure is of the utmost importance to reach an accurate diagnosis and for the appropriate management of de novo symptoms.

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**Citation:** Thomakos N, Trachana SP, Rodolakis A, Bamias A, Antsaklis A (2013) Less Radical Surgery for Fertility Preservation in Patients with Early-Stage Invasive Cervical Cancer Contemporary Problematics. Gynecol Obstet 3: 165. doi:10.4172/2161-0932.1000165