HORIZONS

Upper Ureteric Calculi :A Treatment Dilema

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Introduction

Even in the era of high tech medicine, the management of upper ureteric stones are a challenge. Upper ureteric stone management has changed dramatically from open surgery to flexible uretroscopy and laser lihtotripsy over last three decades. The American Urological Association (AUA)/European Association of Urology (EUA) published the 2007 guidelines for management of upper ureteric stones according to stone size and Location (1). Still certain issues remain contraversial and the best choice of treatment for proximal ureteral stone should be left to the practicing physician .Management can be discussed under following headings

Expectant Therapy

For the spontaneous passage of stone the stone size and location are of utmost importance. Abundant literature is available that predicts the spontaneous passage of stones (2,3,4) .But in a recent prospective study Coll *et al* (5) using an plain helical Computed tomography(CT) showed the spontaneous stone passage rates of48%,60%,and 75% for the stones in the proximal ,middle and distal ureteric calculus respectively. According to the stone size they predicted 87% rate of spontaneous passage for a stone of 1mm which dropped to 25% for a 9mm stone. Clinically ,majority of the spontaneous passage did take place within 4-6wks of first colic.

Role of Medical expulsive therapy (MET)

Various drugs like cortisteroids,NSAIDs,Alpha-1 adrenergic blockers,phosphodiesterase inhibitors,Calcium channel blockers, either alone or in combination have been used for spontaneous stone expulsion. Though, MET is an established modality of treatment for lower ureteric stones (6,7,8) ,it's role in managing upper ureteric stones is still not defined.

Shock Wave Lithotripsy (SWL)

SWL was introduced in early 1980's . Safety and efficacy of SWL has made it the primary treatment modality for upper ureteric stones. However it is not without limitations. Size is an important factor as the stone size <10mm have a clearance rates of 98% which drop down to 68% for stone size>10mm (9).In addition to stone size, calculus impaction also affects the result of SWL. Impacted stones in the upper ureter have higher failure rates following SWL(10). Though there is no universally accepted definition of an impacted calculus. Stone impaction has been defined as, inability to pass a wire beyond the stone at initial attempts and/or the stone remaining at the same site in the ureter for more than 2 months. Other consider an impacted stone as failure to visualize the ureter distal to a stone with proximal hold up of contrast material as long as 3 hours after excretory urography (11,12).

A common thought that SWL is without complications is confounded, as major complications ranging from small bowel perforation, colonic perforation, pyonephrosis, acute renal failure and even death have been reported. The probability of complication increase with the use of higher energy levels, more number of shock waves used, and multiple sessions of treatment. All these are more likely with impacted upper ureteric stones which are difficult to localise, and fragment (9,13,14).

Retrograde Ureteroscopy

The ureteroscope is introduced through the urethra and advanced alongside or over a guide wire into the ureteral orifice under direct vision or under fluoroscopic guidance. The stone is then localized and fragmented. But with the changing times smaller caliber semirigid and flexible ureteroscopes have come so have the newer energy sources(holmium:YAG laser). These have made URS (Uretero Reno Scopy) a safer and more efficacious modality for treatment of stones in the ureter (15-18).

Added advantage of good ureteroscopy is low complication rates, like ureteral perforation rates (<5%), long-term complications such as stricture formation (<2%) (19). Stone-free rates are remarkably high at 81% to 94% depending on stone location, with the vast majority of patients rendered stone free in a single procedure. In treating impacted proximal ureteral stones of > 1 cm, holmium:YAG laser lithotripsy has shown good stone-

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free rates (84%~96.2%) in 1 endoscopic procedure and is more cost-effective than ESWL (20).

Antegrade Percutaneous Nephrolithotomy (PCNL)/ Ureteroscopy

For impacted large stones(>1cm) in the upper third ureter, the retrograde ureteroscopic approach can be very challenging. Also there is a higher chance of retropulsion and other complications. The same stone however, can be managed effectively with a ureteroscope "going down" on the stone, rather than "pushing up" on it.Also this can be used in situation of previously placed PCN for pyonephrosis secondary to impacted upper ureteric stones. In these cases, since the tract has matured, the small flexible ureteroscopes/semi rigid ureteroscope can be passed over a wire directly into the skin without requiring any additional dilation,stone visualized and fragmented. Maheshwari *et al*.(21) compared antegrade and retrograde ureteroscopy for large impacted proximal ureteral stones.The results showed complete stone clearance with antegrade PCNL, with only a 55% success rate with the retrograde approach. However, it should be noted that this study was done when flexible ureteroscopy was developing. In a recent study Aravantinos E *et.al* (22) reported two step antegrade miniureteroscopy using mininephroscope for impacted upper ureteric stones with a succes rate of 94% which improved to 100% at two months. The 2007 Guidelines for the Management of Ureteral Calculi AUA/EAU state that ESWL, ureteroscopy, and PCNL are all acceptable options for the stones > 10mm size (1). At present,PCNL is usually reserved for complex ureteral stones, impacted stones that have failed other treatment modalities, stones in a markedly dilated renal collecting system, large stone burdens. But in contrast to the expense and fragility of semi-rigid and flexible ureteroscopes, the equipment of PCNL is readily available in most urological units, and the required skills are less technically-dependent than for laparoscopy.So, PCNL is still a reasonable option, especially in developing countries (23,24).

Laparoscopic Ureterolithotomy

Wickham in 1979 first reported Retroperitoneal laparoscopic ureterolithotomy in 1979 followed by Raboy et al. who 1992, performed the first transperitoneal laparoscopic ureterolithotomy (25,26). The retroperitoneal approach is considered to be associated with a shorter period of convalescence ,but is associated with higher learning curve. Recently, Tugcu V *et.al* reported a comparison of Retroperitoneal laparoendoscopic single-site ureterolithotomy(LESS-LU) versus conventional laparoscopic ureterolithotomy and concluded that LESS-LU is a safe, reliable, and minimally invasive procedure after failed shock wave lithotripsy or ureteroscopy (URS) (27). In a recent comparative study for upper ureteric stone,Fang YQ *et.al* reported a higher stone clearance rate and shorter operation time for laparoscopic ureterolithotomy compared with ureteroscopic laser lithotripsy (28).Today, laparoscopic ureterolithotomy is reserved for patients refractory to ESWL and other endourological procedure or for those undergoing laparoscopy for concomitant indications, as well as those settings in which ureteroscopy is not available (29).

Open Ureterolithotomy

The indications for an open ureterolithotomy in present era are rare. Presently,it is indicated for failure of all minimally invasive modalities, a concomitant open procedure, and the presence of large impacted stones for which patients who don't consent for multiple procedures (30).

Blind basketing : No role in the present era.

Conclusion

'One size fits all' policy does not hold true for the management of Upper ureteric stones, specifically in our settings. While choosing the optimal treatment for upper ureteric stone stone size, stone composition,duration of impaction , severity of proximal dilatation, associated infection, type of lithotripter available(specially in third world countries), patients willingness(hilly terrain),patient financial status and availability of endourology equipment/ expertise should be taken into consideration. After weighing these variables, urologists should inform patients of the advantages and disadvantages of each treatment modality, and decide what the best treatment is for each individual patient.

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