Treatment modalities for the upper urinary system stone disease in Turkey

Türkiye'de üst üriner sistem taş hastalığı için tedavi yaklaşımları

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Abstract

Objective: In this study, we aim to determine the preferred treatment modalities in upper urinary system stone disease throughout Turkey in 2008.

Materials and methods: In our country, all healthcare providers who are subjected to Social Security Institution send their medical claims digitally to a data pool controlled by Social Security Institution which covers 70% of the population. Data sets were analyzed by national health authorities to facilitate policy making. In this study, we have analyzed the treatment approaches to urinary stone disease for a certain period of time (10 months) in 2008 by using selected data sets from this warehouse. To estimate the countrywide figures within a year, the obtained data is projected for the whole population. The quantitative data on open surgery, percutaneous nephrolithotomy (PCNL), ureteroscopy (URS) and shock wave lithotripsy (ESWL) in the treatment of upper urinary system stone disease have been estimated. The figures represent the number of procedures rather than the number of patients.

Results: Within a year 751,844 urological interventions were performed, 6.2% of which were related to urinary system stone disease. Totally 87,302 patients underwent surgical treatment or ESWL therapy within a year because of upper urinary system stone disease. Surgical treatment and ESWL was applied for 46,619 (53.3%) and 40,683 (46.7%) patients, respectively. Among management modalities applied for upper urinary system stone disease, open renal (11%) or ureteral surgery (6%), PCNL (17%), and ureterorenoscopic lithotripsy (66%) have been employed at various incidences.

Conclusion: Procedures performed for the treatment of urinary system stone disease in Turkey were relatively high among all urological procedures. The percentage of ESWL in all upper urinary stone treatment is almost 50%. Open kidney surgery is still a common procedure with a rate of 39%. As is the recent trend in the reported data from other countries URS is the primary choice of treatment for ureteral stones in Turkey.

Key words: Open surgery; percutaneous nephrolithotomy; shock wave lithotripsy; upper urinary system stone disease; ureteroscopy.

Özet

Amaç: Bu çalışmada Türkiye genelinde 2008 yılında üst üriner sistem taş hastalığında tercih edilen tedavi yaklaşımlarını belirlemeyi amaçladık.

Gereç ve yöntem: Ülkemizde Sosyal Güvenlik Kurumu'una bağlı olarak sağlık hizmeti sunan kurumlar tıbbi istek kayıtlarını dijital olarak Sosyal Güvenlik Kurumu tarafından kontrol edilen ve toplumun %70'ini kapsayan bir veri havuzuna gönderirler. Bu veriler sağlık politikalarının oluşturulmasını hızlandırmak için ulusal sağlık otoritelerince analiz edilirler. Bu çalışmada, bu havuzdan seçilmiş verileri kullanarak 2008 yılında belirli bir zaman dilimi içinde (10 ay) üriner taş hastalığına tedavi yaklaşımlarını değerlendirdik. Ülke geneline ait 1 yıllık verileri tahmin etmek için, elde edilen veriler tüm popülasyona yansıtılmıştır. Üst üriner sistem taş hastalığı tedavisinde açık cerrahi, perkütan nefrolitotomi (PCNL), üreteroskopi (URS) ve şok dalga litotripsi (ESWL) üzerine kantitatif veriler tahmin edilmiştir. Veriler hasta sayısından çok işlem sayısını ifade etmektedir.

Bulgular: Bir yıl içinde 751,844 ürolojik girişim gerçekleştirilmiş, bunların %6.2'si üriner sistem taş hastalığı ile ilişkili olmuştur. Üst üriner sistem taş hastalığı nedeniyle toplam 87,302 hastaya bir yıl içinde cerrahi tedavi ya da ESWL tedavisi uygulanmıştır. Cerrahi tedavi ve ESWL tedavisi sırasıyla 46,619 (%53.3) ve 40,683 (%46.7) hastaya yapılmıştır. Üst üriner sistem taş hastalığı için tedavi yaklaşımları arasında açık renal (%11) ya da üretral cerrahi (%6), PCNL (%17) ve üreterorenoskopik litotripsi (%66) farklı oranlarda uygulanmıştır.

Sonuç: Türkiye'de üriner sistem taş hastalığı için uygulanan prosedürler tüm ürolojik işlemler arasında önemli yer oluşturmaktadır. Tüm üst üriner taş tedavisinde ESWL oranı yaklaşık %50'dir. Açık böbrek cerrahisi %39 oranıyla hala sık uygulanan bir işlemdir. Diğer ülkelerden bildirilen verilerdeki güncel eğilime benzer olarak, Türkiye'de ilk tedavi seçeneği URS'dir.

Anahtar sözcükler: Açık cerrahi; perkütan nefrolitotomi; şok dalga litotripsi; üreteroskopi; üst üriner sistem taş hastalığı.

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During the last 25 years, immense changes have taken place in the management of urinary system stone disease. In the past, kidney and ureteral stones had been treated with open surgery. Nowadays these procedures are rarely employed all around the world. Currently, urinary stones are managed with minimally invasive endoscopic procedures such as percutaneous nephrolithotomy (PCNL), ureterorenoscopic lithotripsy (URS) or with more noninvasive methods as extracorporal shock wave lithotripsy (ESWL). Patient-related factors and the attending physician's preferences play important role in the choice of the treatment modality to be used.

To date, numerical data related to the interventions targeting urinary system stone disease, and their place among all urological operations are limited in the world as it is also the case in Turkey. Despite various limitations, the present study aims to fill this gap by analyzing the national records related to upper urinary system stone disease performed in Turkey within a year.

Materials and methods

In our country, all healthcare organizations providing medical services for patients subjected to Social Security Institution send their data regularly to a computerized data pool called MEDULA governed by Social Security Institution. Howewer, the database does not cover some minor groups such as green card holders (a security coverage for poor people unable to pay healthcare expenses), civil servants, martyrs, and veterans who are under the coverege of different social security institutions which constitute 28% of the general population. Additionally, a negligible portion patients with private healthcare insurance or those paying their own healthcare expenses are not covered which consist of less than 3% of the population.

According to address based population registry system of Turkish Statistical Institute, population of Turkey was 71.5 million in 2008. Over 51 million whose data is kept in the warehouse comprised 72% of the whole population. Findings obtained from 72% of the whole population were extrapolated for the whole population in one year-term. Thus the outcome of our analysis based on this data pool, reflects the figures related to management approaches for urinary system stone disease in Turkey in 2008[1]. Patients who received medical treatment for urinary system stone disease were not evaluated in this analysis.

The place of open surgery, ESWL and interventional procedures such as PCNL and URS performed for the management of urinary system stone disease have been investigated. Vesical stones, and related management modalities were not included in the study. Analyses have been made separately for university hospitals, teaching hospitals, public hospitals and private hospitals. The data demonstrate the number of spesific procedures performed rather than the patient population. Besides the surgical interventions this data also contains the diognostic and therapeutic figures which are reported to MEDULA. Although MEDULA classifies ESWL data according to sessions as 1st, 2nd, and 3rd; the first session was taken into consideration to determine total number of treated cases in our study.

Results

Based on 2008 registry data, total number of urologists (n=1905) was distributed among university hospitals (n=290, 15%), teaching hospitals (n=240, 12%), private healthcare centers (n=587, 31%), and public hospitals (n=805, 42%).

Distribution of all urological procedures and surgical cases related to upper urinary system stone disease operated in one year are shown in Table 1. The distribution of all urological operations were 15.9%, 19.5%, 22.3% and 42% for university, teaching, private and public hospitals respectively. Within a year 751,844 urological procedures were performed, 46,619 (6.2%) of which were related to urinary system stone disease. Besides 40,683 patients underwent ESWL. Among management modalities applied for upper urinary system stone disease, open renal (11%) or ureteral surgery (6%), PCNL (17%), and ureterorenoscopic lithotripsy (66%) have been employed at various incidences.

Surgical procedures were performed with varying frequencies in universities (21.72%), teaching hospitals (16.97%), private centers (29.07%), and public hospitals (32.14%). For ESWL the corresponding percentages were 23%, 5.5%, 50.1%, and 21.2%, respectively (Table 2).

Out of a total number of 13,347 renal stone surgeries, 39.1% were achieved with open renal operation and 60.9% with percutaneous lithotomy. Distribution of the cases according to various types of healthcare centers are shown in Table 3.

In our country totally 33,272 patients with ureteral stones were treated by open surgery (8.22%) and via ureterorenoscopic (91.78%) interventions. Distribution of cases among healthcare providers are shown in Table 4.

Table 1. Distribution of all urological procedures and surgical cases for upper urinary system stone disease operated in one year

	University hospitals	Teaching hospitals	Private hospitals	Public hospitals	Total
Total number of urological procedures	119,818	147,108	168,054	316,855	751,844
Surgical procedures for upper urinary system stone disease	10,150	7,912	13,553	15,004	46,619
Stone/total number of surgeries	8.4	5.3	8	4.7	6,2
Total number of urologists	290	240	587	805	1,905

Table 2. Distribution of number of surgical procedures for the treatment of upper urinary stone disease and ESWL therapy in various healthcare centers in our country

	Surgical procedures		Extracorporal shock wave lithotripsy	
	n	%	n	%
University hospitals	0,150	21.7	9,371	23
Teaching hospitals	7,912	16.9	2,249	5.5
Private hospitals	13,553	29	20,417	50.1
Public hospitals	15,004	32.1	8,646	21.2
Total	46,619	100	40,683	100

Table 3. Distribution of open surgical and percutaneous interventions for the management of renal stones among healthcare providers

	University hospitals		Teaching hospitals		Private hospitals		Public hospitals		Total	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Open renal surgery	897	(17.88)	1,055	(32.57)	1,359	(51.07)	1,905	(78.29)	5,216	(39.1)
Percutaneous nephrolithotomy	4,117	(82.12)	2,184	(67.43)	1,302	(48,93)	528	(21.71)	8,131	(60.9)
Total	5,014	(100)	3,239	(100)	2,661	(100)	2,433	(100)	13,347	(100)

Table 4. Distribution of treatment options for ureteral stones among healthcare providers

	University hospitals		Teaching hospitals		Private hospitals		Public hospitals		Total	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Open ureteral stone surgery	448	(8.73)	550	(11.77)	624	(5.73)	1,115	(8.86)	2,737	(8.22)
Ureteroscopy	4,688	(91.27)	4,123	(88.23)	10,268	(94.27)	11,456	(91.14)	30,535	(91.78)
Total	5,136	(100)	4,673	(100)	10,892	(100)	12,571	(100)	33,272	(100)

Open ureteral stone surgery was performed with varying frequencies in university hospitals (16.36%), teching hospitals (20.09%), private hospitals (22.79%), and public hospitals (40.73%). For therapeutical ureteroscopic interventions performed in our healthcare centers, the corresponding percentages were 15.35%, 13.50%, 33.62%, and 37.51%, respectively.

Discussion

Among treatment alternatives for urinary system stone disease, monitorization of the patient, medical treatment, ESWL, PCNL, ureterorenoscopic interventions and open surgery can be enumerated. Depending on the technological advances, endoscopic instruments evolved rapidly, and made management of stones possible without the need for open surgery. Advantages and disadvantages of the method to be chosen must be priorly weighed with the patients in detail, and one of the treatment modalities suitable for the patient can be used. In our country ESWL is used for the treatment of nearly half of the patients (45.31%) with upper urinary system stone disease. Our analysis demonstrated that private healthcare centers accounted for 50% of ESWL cases.

In the light of data recruited from 1988 Medicare database, interventions performed for the management of urinary system stone disease were reported in decreasing frequency as ESWL (54%), URS procedures (41%), and open surgery (4%).[2] Since Medicare covers patients over 65 years of age, and those with chronic diseases, many stone patients are not eligible for Medicare, and its database is not suitable for epidemiological analyses. In another data set released as a result of assessment of American Project Healt Care Centre and United Health Group, rates of ESWL and URS procedures were 54% and 42%, respectively.[3] However, the classification of procedures according to the attending physicians' experience in the first, and the healthcare centers in the second study has complicated the comparison of both studies. In our study among surgical interventions for the treatment of upper urinary system stone diseases, open renal or ureteral surgery, PCNL and URS were seen to be performed in 11%, 6%, 17% and 66% of the cases, respectively. This constitute 53% of all stone treatments. The remaining 46% underwent ESWL treatment. The distribution of these data among healthcare centers were given in detail. Since our data source MEDULA covers an important percentage (72%) of the Turkish population, it is possible to extrapolate the data to the population in general with a higher degree of accuracy. The abovementioned studies do not reflect the population as a whole. However, since the data itself has not been obtained from a prospective study and monitored in the field, scientific realibility of the information taken from MEDULA can be questioned.

In both of the databases refered, though ESWL has been performed at a higher rate, the reason for its preference is unclear. In our study, ESWL has represented half of the treatment modalities. Even if urology is a surgical discipline, noninvasive ESWL is apparently preferred at a greater rate.

In the e-mail investigation performed by Bandy et al.[4] ESWL appears to be the most preferred treatment modality in North America. This study demonstrated that ESWL had been preferred by urologists practicing at least for more than 20 years. In our country, ESWL is rather preferred by private care providers. The reason for this preference is probably facilitated investment of modern equipment in these private healthcare centers.

Matlaga[3] detected rates of ESWL, URS, and PCNL as 29.8%, 39.3%, and 30.2% respectively in Wake Forrest University Hospital between 1998 and 2001. Another group reported on patients treated for upper urinary tract stones at Washington University Hospitals in 1990 and 1998 to define trends in practice patterns (unpublished data). URS accounted for 8% of procedures in 1990, but increased to 13% in 1998. In contrast, ESWL accounted for 66% of procedures in 1990 and 59% in 1998. PCNL demonstrated a modest increase from 25% in 1990 to 28% in 1998. Again there is likely a referral bias affecting the procedure distribution at this academic center. Though many academic centers have reported their rates of surgical interventions, those are not expected to reflect their role within the context of general treatment and treatment preferences of the targeted population at large.

When compared with data recruited from Medicare, relatively higher number of PCNL is performed in our country (%11 vs. %6).[2] This difference may arise from the cover of Medicare insurance policy, and also from a 10-year interval between these two studies. The reason of the high numbers of the PCNL operations in our country compared with data recruited from Medicare, may be caused by the late admittance of the stone patients to the hospitals in countryside of Turkey and big sized renal stones who are candidates for percutaneous surgery and additionally covering the high number of stone patients from the Medicare insurance policy.

Irrespective of the practicing center, all over the country, URS appeared to be frequently preferred in the management of ureteral stones. Required technological ultrastructure for this treatment modality seems to be widely distributed and used routinely including state public hospitals.

In the treatment of kidney stones, open surgery is gradually surpassed by other treatment options. PCNL is gradually applied in place of open surgery. Nowadays, especially in the treatment of kidney stones, percutaneous endoscopic stone treatment can be applied with higher success rates almost in all urology clinics.

PCNL, and open surgery constituted 60.9% and 39.1% of all renal stone surgeries performed in Turkey, respectively. Half of the percutaneous interventions have been performed in university hospitals. Although percutaneous nephrolitotomy has replaced open stone surgery substantially, and reduced its application up to 2-5%, open surgery still maintains its place in our country, that is to say percutaneous stone surgery does not fully replace open surgical treatment except in some limited number of centers.

As also reporeted by Pearle at al.[2] in the last two and a half decades, the surgical management of stone disease has evolved from an invasive treatment with a prolonged hospitalization and long convalescent period to a minimally invasive day case treatment with little or no hospitalization and a short recovery period. Information from several data sets suggests that ESWL is the most frequently performed surgical treatment, followed closely by URS, with little change in the distribution of procedures in the last decade.

According to data reviewed by Kerbl et al.[5] from the Health Care Financing Administration (now known as CMS) to identify changes in the distribution of surgical procedures with time, ESWL and PCNL remained relatively stable at 70-80% and 4-6% of all stone removal procedures performed between 1992 and 2000, respectively. However, ureterorenoscopic interventions increased by almost 60% during that interval accounting for 14-22% of all stone clearance procedures, which was still a much lower rate than indicated by the data sets reviewed by Pearle at al.[2] As indicated by the authors, the reason for this discrepancy is unclear, but it is likely that endoscopic treatment will represent a greater proportion of procedures in the future .

Although ESWL still remains the most commonly performed procedure for upper urinary tract stones, followed by ureteroscopic and percutaneous nephrostolithotomy, the trends in distribution of surgical treatment modalities show some inconsistencies among various databases. The fact is that, the number one consistent trend identified by all data sets is a dramatic decrease in the use of open surgery. As been previously reported, ESWL is the most commonly used intervention in the treatment of patients with upper urinary tract calculi. We have found that ESWL was more commonly used by private centers, probably due to rapid technological investments.

Totally 87,302 procedures were performed for the treatment of urinary system stone disease in Turkey within a year. The percentage of ESWL in all upper urinary stone treatment is almost 50%. Open kidney surgery is still a common procedure with a rate of 39%. As is the recent trend in the reported data from other countries in ureteral stones, URS is the primary choice of treatment in Turkey.

Conflict of interest

No conflict of interest was declared by the authors.

References

1. Demir M. Unpublished data obtained from the Progression Report of Ministry of Health by Mehmet Demir MD, Advisor to the Minister. 2009.

2. Pearle MS, Calhoun, EA, Curhan GC. Urological Disease in America Project: urolithiasis. J Urol 2005;173:848-57.
3. Matlaga BR. Contemporary surgical management of upper urinary tract calculi. J Urol 2009;181:2152-6.
4. Bandi G, Best SL, Nakada SY. Current practice patterns in the management of upper urinary tract calculi in the north central United States. J Endourol 2008;22:631-6.
5. Kerbl K, Rehman J, Landman J, Lee D, Sundaram C, Clayman RV. Current management of urolithiasis: progress or regress? J Endourol 2002;16:281-8.

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