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Current Trends in Urolithiasis Treatment in Various European Health Systems

Key Words

Urolithiasis · Treatment · Health system · Europe · Trend

Abstract

Objective: In spite of readily available evidence-based guidelines on urolithiasis treatment, practical applications of treatments vary from country to country, or even within countries. The choice of treatment depends not only on the evidence, but often on general non-medical decision factors such as infrastructure, expertise, trends, patient demands, industry drive and reimbursement levels. In turn, many of these factors are interdependent and a result of the individual National Health System. **Method:** In an attempt to get a crude picture of trends and practices in stone treatment across Europe, a group of well-renowned international experts in the field were asked to reply to a set of standard questions relating to stone treatments, health systems and adherence to guidelines (level of evidence D = expert opinion). **Results:** The above-mentioned interdependencies showed a varying picture in different countries. Overall, there is a trend away from lithotripsy and toward ureterorenoscopy. However, the choice of treatment is largely dependent on the affordability of infrastructure. Urologists may make choices based on the national reimbursement system, too. **Conclusion:** Without claiming to represent a scientific

cally sound study, this survey represents an interesting insight into a representative cross-section of European urological current practices and trends in urolithiasis treatment.

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Introduction

Due to major advances in technology, stone treatment has developed significantly over the last few decades [1]. Historically, treatment for the same disease has always been varying between continents, countries and societies [2]. Information on trends in managing stone disease across Europe is however scarce [3]. In the same city, or sometimes even in the same department huge differences between treatment strategies can be present.

With this in mind, the European Urolithiasis Section (EULIS) of the European Association of Urology (EAU) initiated a questionnaire study on health systems in general and on differences in stone services, in particular, across several European countries with a focus on the respective health system-related remuneration modalities for selected therapies: shock wave lithotripsy (SWL), ureterorenoscopy (URS), percutaneous nephrolithotomy (PCNL) and open surgery. We were, of course, aware that these would be highly subjective data that might or

might not be backed up by statistical evidence. This ensuing article is the attempt to summarize trends and opinions from national opinion leaders in stone treatment to paint a picture of variations in stone treatment in Europe. It does not pretend to deliver solid statistical evidence. However, all of the participants are experienced long-serving stone specialists in their respective countries who have seen governments and policies change many times. We felt that their own impressions and interpretations of trends and developments would be representative and relevant (evidence level D: expert opinion).

Material and Methods

As widespread impersonal surveys are known to have a bad response rate [4], we decided to take a more individualized approach by asking urologists who are known experts in the field of stone treatment for their participation. On behalf of EULIS, selected board members, associates and some affiliated colleagues were approached. They were asked to write a short paragraph of no more than 600 words answering 5 specific questions:

- Their National Health System (NHS): basic structure and important policies?
- Reimbursement policies and trends?
- How do urologists typically work in your country?
- What are the characteristic features and trends of stone services in your country?
- How does the above impact on stone treatments in the light of EAU guidelines?

With this individualized approach, the response rate was 100%. The statements from each author were then edited and analyzed to highlight the most relevant information and to show trends, similarities or differences in management of stone disease in the different countries.

The choice of countries co-incides with the availability of the experts and is entirely unsorted. However, the selection is thought to be representative.

Results

Country-Specific Responses

Austria (C.T.)

Healthcare funding is composed of mandatory social insurance system (50%), taxes (25%) and patients (25%). Urologists' work may be hospital- and/or office-based, which means the latter are part of primary care. Austria has 20 hospital-based lithotripters. Endourology for stones is offered in all urologic departments (14 urology departments with 7 lithotripters in 5 institutions in Vienna alone). Treatment of stone patients follows EAU guidelines.

Bulgaria (I.S.)

Compulsory health insurance with the National Health Insurance Fund provides basic medical care without costs for medical disposables, products and devices. Optional voluntary supplementary health insurance and/or patient payments make up for the shortfall. Strained finances result in a clear trend toward shorter hospital stay and increased follow-up by general practitioners (GPs). Typically, urologists work full-time in urological departments and, on top of that, part-time privately. Patients are referred by the GP. The waiting time for stone surgery can exceed 1–2 months. The majority of hospitals use mobile lithotripters, which is the primary treatment for many patients as endourology is not available in the smaller hospitals. PCNL is performed in few centers. There are no specialized metabolic stone clinics in Bulgaria.

Denmark (P.O.)

Denmark has a state-run tax-funded NHS that is free for the end-user. Parallel to financial restrictions, quality of care has suffered and waiting lists have increased. Private health services are negligible. There is a clear trend toward shorter hospital stay, increased day surgery activity and clinical follow-up by community doctors. Most urologists work full-time in the NHS. Only very few have a private practice. Patients are referred to the urologist by a GP. An evidence-based reimbursement approach does not favor one treatment over the other. Not all urological departments are allowed to perform SWL, PCNL and flexible URS (fURS), with a trend toward specialized stone centers. There are 7 hospital-based lithotripters and very few mobile SWL services. Lists are usually heavily booked months in advance. EAU guidelines are to a large extent followed although there is a trend toward endoscopic stone treatment. Principles of metabolic and medical management according to the Scandinavian Cooperative Group for Urinary Stones have been implemented in nearly 100% of Danish urological departments. The guidelines of the EAU on this are considered too elaborate and are not used.

France (G.R.)

Reimbursement is made by the national 'Social Security', which in a way functions like an NHS. However, it is only a reimbursement organization. It covers about 70% of the costs. Therefore, most patients have a supplementary mostly employer-based mutual health insurance. Private healthcare amounts to 50% of the total. Reimbursement is based on a 'case-mix' system for both, social security and private, with a generally poor cost

analysis. About 70% of urologists work privately. Patients can directly see them but reimbursement will be more if they are referred by a GP. Extracorporeal SWL is still a first-choice treatment followed by URS and PCNL. The acquisition of lithotripters is unplanned, and therefore, there is no limitation to treatments and all will be reimbursed. Both, ureteroscopic interventions and lithotripsy have increased since 2006, whereas surgical and percutaneous interventions have stagnated.

Germany (T.K./L.D.)

Germany has a dual system of either statutory health insurance (15.5% of net income) or private insurance. In 2014, 11.2% of the population >14 years of age had private insurance. Another 17.75 million in the public sector had supplementary private insurance for inpatient treatment only [5]. Reimbursement is based on the evidence-based medicine system or GoÄ (Gebührenordnung fuer Aerzte/fee schedule for doctors) for public or private health insurance. GoÄ allows higher reimbursement fees and has no upper limit on how often a procedure (like SWL) can be repeated and reimbursed. The statutory health insurance tries to increase day surgery activities. As reimbursement is on an average 66% lower than it is for inpatient treatments, hospitals try to avoid this. However, hospital stay has shortened significantly overall. Urologists in Germany either work in a hospital or as office urologists. Only the chairmen of the hospital departments are allowed to treat out- and inpatients privately as well. On top of the inpatient reimbursement based on the DRG system, private patients can be billed for the doctors' fees. This increases hospital revenue by 21–46%, depending on the procedure [6]. Private and supplementary private insurance are available to approximately 33% of all inpatients [5]. Stone procedures are performed mostly in hospital departments. SWL is done either as out- or inpatient procedure. Mobile services are mostly used by office urologists.

There is a clear trend toward more endoscopic treatments. In general, waiting lists are short. Most hospitals offer all standard treatments (SWL, URS and PCNL). The impression is that national and European guidelines are well followed; however, URS and mini-PCNL are popular, the latter especially for lower pole calculi.

Greece (A.P.)

Greece has a state-run insurance-based tax-funded NHS that is free for the end-user. There is a parallel private health service with private hospitals mainly in Athens

and Thessaloniki. Patients either pay themselves for services or are voluntarily insured. Salaries have been reduced and the trend is to keep all costs as low as possible. This may result in functional problems. Urologists work full time in the NHS and are allowed to see their own private patients outside of work hours in the NHS hospital. Most urologists in the private sector of small towns are office urologist and see patients directly as there is a shortage of GPs. Few major NHS hospitals have lithotripters, and there are no mobile lithotripter services. Most lithotripters are in the private sector. Operating lists are usually heavily booked several months in advance. Only few large NHS hospitals perform fURS and PCNLs. There is an increased use of SWL as a first-line treatment. The EAU guidelines are mainly followed in large NHS hospitals with the relevant expertise for fURS and PCNL to be routinely performed.

Italy (A.T.)

Italy has a state-run tax-funded Servizio Sanitario Nazionale (SSN) that is free for the end-user. The 20 regions run it independently by financing the activities of public and 'affiliated' private hospitals that compete with each other. Patient can choose between public or private hospitals, regional or elsewhere. Private health service is negligible. The SSN functions on a fee-for-service platform. There is a trend toward shorter hospital stay, increased day surgery activity and more clinical follow-up by community doctors. Almost all urologists have a part-time private practice. Most hospitals own a lithotripter, few use mobile lithotripter services. As a result of the competition between waiting lists in hospitals, all procedures are short. SWL inpatient treatment has been economically attractive and has given rise to about 300 lithotripsy centers. Thus, large-volume stones can be inappropriately treated with repeated SWL. More recently, rates have changed leading to more balance between endoscopic and SWL according to EAU guidelines. PCNL is not yet widespread. The metabolic aspects are often overlooked and always referred to the nephrologist.

Portugal (J.M.R.-S.)

Portugal has free public healthcare (NHS) financed by tax money. Recently, contribution fees payable by the patient have been introduced. Portugal has an important parallel private sector offering high quality care. This creates a mixed system, where partial reimbursement by the state can be combined with patients' payments. There are contracts with national or foreign private services where

patients can be sent for treatment if they cannot be treated in optimum time. The general trend is to reduce costs, increase outpatient treatments and shorten hospital stay. Most urologists work full time or part time in the NHS. The majority have a private practice that complements their very low income. Lately, many urologists have left the NHS to work exclusively in the private sector. During the 80's, there were a couple of centers skilled in percutaneous surgery but the introduction of lithotripsy caused this type of surgery to diminish. Still urology departments perform open surgery where minimally invasive options would be indicated. Most hospitals have access to a lithotripter, and due to a large number of lithotripters, there is an increase in SWL as first-line treatment. Waiting lists are long. Despite this, there has been a clear trend toward fURS and PCNL limited by costs and theatre time. There are very few units doing stone analysis, metabolic studies and prophylactic advice or treatments.

Romania (P.G.)

Romanian has an NHS. Reimbursement is based on the number of patients and the complexity of cases. A big problem is that patients prefer to see specialists directly and avoid GP referral. More recently, despite the lack of a private health insurance system, private care has rapidly developed. Most urologists work full time or part time in public hospitals. Most have a private practice outside working hours. Only few urologists chose to work exclusively in private practice. Stone services (URS, PCNL and SWL) are limited to major urological centers. There are no mobile lithotripsy services. Few major hospitals have lithotripters. Semi-rigid ureteroscopy is considered as the first-choice treatment for most stones. SWL has been developed recently in some private centers.

Spain (J.A.G.)

Spain's health service is run by regional governments, tax-funded and free for the end-user. A newly emerging model is a public system with private management. Around 15–20% of the population are privately insured, and people can simultaneously use both systems. Exclusively, private healthcare comprises around 5%. There is a clear trend toward shorter hospital stay, increased day surgery activity and more clinical follow-up by community doctors. Most urologists have an additional private practice. Patients need a referral from a GP in the public system, not in private. Few major hospitals have lithotripters. As more SWL machines are being newly installed, waiting lists are now decreasing. SWL is consid-

ered to be the first-line treatment for a large number of stones, but semi-rigid URS is on the rise. Flexible ureteroscopy remains rare since many centers lack this technology. PCNL and metabolic stone evaluation are performed in only few centers.

Sweden (H.-G.T.)

The National Health Insurance system covers the cost of all healthcare activities. Patients pay a symbolic fee when visiting outpatient units. Reimbursement is based on the DRG system with a set price for each treatment. There can be a great difference between actual costs and reimbursement. There is very little private practice in Sweden. In 2006, 77% of all stone patients were treated with extracorporeal SWL, 18% with ureteroscopy and 4% with percutaneous surgery. Still, 0.4% had their stones removed by open surgery. The EAU guidelines are generally followed. Biochemical risk evaluation and recurrence prevention is seriously neglected in most centers though.

Turkey (T.K.)

Turkey has a state-run tax-funded health service coordinated by the Social Security Institution and free for the end-user. It has signed an agreement with private hospitals and consequently the quality of health service has improved. Approximately 10% of people on low income are allowed free health service. The private sector is comparatively negligible (15–20%). There is a clear trend toward shorter hospital stay, increased day surgery activity and more clinical follow-up by community doctors. Urologists generally work full time in state or private hospitals. Only professors can work part time and most have a private practice. Patients can choose to be examined by a GP or directly by an urologist. Waiting lists of several months are still the norm. SWL is used as a first-line treatment for many stones. The majority of public hospitals have lithotripters. There has been a clear trend toward fURS and PCNL. Throughout the country, major hospitals tend to be sub-specialized stone referral centers.

United Kingdom (N.B.)

The state-run NHS is free for the end-user and financed by tax money. There is a negligible parallel private health service. Consecutive governments have invested large sums into the service and have implemented rigorous quality targets. In the NHS, the more you do, the more you get paid for. There is a clear trend toward shorter hospital stay, increased day surgery activity and clinical follow-up by community doctors.

Most urologists work full time or at least part time in the NHS, and most have a private practice. All patients need referral by a GP.

Operating lists are usually heavily booked months in advance. The majority of hospitals in the UK use mobile lithotripter services. All the above leads to an increased use of SWL as a first-line stone treatment even if not recommended by the EAU guidelines. It is simply a matter of a shorter waiting list for SWL. Despite this, there has been a clear trend toward fURS and PCNL – however, smaller units will struggle with the costs. Sub-specialized stone centers are developing as tertiary referral centers that usually have associated metabolic stone clinics.

Discussion

Worldwide, there is a tendency to shy away from SWL toward more active (and more invasive) endourological stone management using URS and PCNL [7, 8]. The rising number of corresponding publications over the last decade mirrors this development [3]. All countries have shown an increased interest in especially fURS. Still, to date, well over 50% of all stones are treated with SWL [9].

In an ideal world, the method of treatment for a given stone should depend solely on medical indications based on solid evidence. Yet, as we all know and have experienced, many other mainly economical and infrastructural factors can come into play.

There is evidence that the method of payment influences the behavior of physicians [10] and can lead to more diagnostic tests, higher drug use and higher surgical rates [11]. It can be assumed, that the same is true for the choice between different surgical options. From Sweden, it is reported that SWL is not reimbursed in an economically viable way, whereas in France even multiple consecutive SWL sessions are reimbursed leading to an increasing number of treatments over the last years [11]. The same situation we have found in Italy, where lithotripsy was economically very attractive over the last years leading to high treatment numbers. After changing reimbursement policies, the number of alternative endourological stone treatments began to rise there. An unregulated market for the acquisition of lithotripters can lead to increasing number of lithotripters waiting to be amortized as reported from France and Italy. This is illustrated by a lithotripter:population ratio of 1:200,000 in Italy, as compared to Spain with 1:512,000 [12].

In the current climate, nearly all countries experience high economic pressures and the need to deliver health-

care as cost effectively as possible. The means to achieve this could be a rise in day surgery activity [13], a shorter hospital stay and an increased follow-up with the help of community doctors. Almost all countries have gone down that path. However, in Germany where day case surgery yields far less income than inpatient procedures, hospitals seem to resist. This illustrates quite well that there is no fit-for-all solution, and although health systems as a whole have to save money, single stakeholders' interests may jeopardize such efforts.

The question as to the actual costs of a particular treatment has not been conclusively answered yet. Is endourology cheaper or lithotripsy? This may depend on the clinical situation as well as on the national infrastructural circumstances. Recently, a British study on lower poles stones <2 cm revealed URS to be more expensive than SWL – at least in the UK setting [14]. For all treatment modalities, there are improvements published, which can make the treatment more effective and hence more economical. A good example is the reduction of the shock wave rate in SWL, which enhances stone fragmentation and overall efficacy [15]. However, this entails thorough initial training for all urologists in all methods and continued medical education throughout a professional life.

In most of the countries with government regulated health systems, heavily booked operating lists and long waiting times up to several months seem to be the norm. Countries where healthcare is more competitive, demand-led and relatively autonomous, such as Austria, Germany, France and Italy, report much shorter waiting times [16]. Waiting times can be a major issue also for our stone patients who will have to tolerate temporary measures such as a JJ stent for long periods of time and will develop interim complications that could have been avoided with immediate treatment [17]. One option to avoid this, albeit at high costs, is to send patients to private contractors or foreign countries, should state provision fail or not be in time, as reported from Portugal. Such 'medical tourism' is also reported for many other specialties worldwide [18]. Again, streamlining and optimizing patient pathways is the call of the hour. Another good example is the optimization of the utilization of treatment slots for SWL through virtual nurse-led X-ray review clinics [19]. Waiting times are significantly influenced by a country's total expenditure on health [20]. The number of urologists per population will determine not only quality of healthcare delivery but also its speed. Countries with shorter waiting lists, such as Germany (1:15,000) or Austria (1:16,300) stand in contrast to those with long

Table 1. Population and number urologists*

Country	Inhabitants ¹	Urologists	Population/ urologist
Austria (AT)	8,404,252	560 ²	15,006
Bulgaria (BG)	7,504,868	300 ³	25,016
Denmark (DK)	5,560,628	120 ⁴	46,338
France (FR)	65,075,310	1,350 ⁴	48,203
Germany (DE)	81,751,602	5,000 ⁵	16,350
Greece (GR)	11,329,618	960 ⁴	11,801
Italy (IT)	60,626,442	2,500 ⁴	24,250
Portugal (PT)	10,636,979	300 ⁴	35,457
Romania (RO)	21,413,815	343 ⁴	62,430
Spain (ES)	46,152,926	2,200 ⁴	20,979
Sweden (SE)	9,415,570	380 ⁴	24,778
Turkey (TR)	73,722,988	1,900 ⁴	38,802
United Kingdom (UK)	62,435,709	600 ³	104,060

¹ Eurostat, 2010.

² European urology today May 18, 2011: life of a urologist in Austria.

³ Personal communication.

⁴ <http://esru.uroweb.org/countries-pages/>.

⁵ www.urologielehrbuch.de/.

* In some countries, there is a 2-tiered system of office and hospital urologists, which may explain amongst other factors the low number of population per urologist in those countries.

waiting lists in state-run institutions and a lower number of urologists such as Turkey (1:39,000) or the UK (1:104,000; table 1).

Another factor affecting the choice of stone treatments is the availability of technologies. fURS for example carry a high cost of acquisition and maintenance [21]. Not surprisingly, wealthier countries report growing treatment numbers with fURS (Germany, UK) whereas Romania and Spain use more semi-rigid URS. An unexpected finding was the reduction in PCNL through loss of expertise over the years after introduction and promotion of SWL as reported from Portugal.

According to current literature, the Northern European countries have access to every type of lithotripter followed by the Southern and the Eastern European countries [22]. From eastern European countries higher treatment numbers of PCNL are reported due to the high acquaintance costs of lithotripters and consequently the low number of such machines available [3].

Open stone surgery plays a very limited role in modern stone treatment. In the developed world, its rate is 0.7–2% [23], whereas in less developed countries the rate has to be set higher. Accordingly, in Sweden, its

rate was reported 0.4%. Somewhat surprisingly, this rate was reported being higher in Portugal, the reason being a lack of modern equipment due to financial restriction.

As mentioned above, in an ideal world the choice of treatment should solely depend on medical indications based on evidence. National and international guidelines are an attempt to standardize treatments in order to improve efficiency and reduce inappropriate practice [24]. In this regard, the EAU guidelines [25] offer a comprehensive manual for stone treatment. In general, all members have reported that these guidelines are followed as far as possible with variances caused by the above-mentioned factors.

Although of utmost importance, metabolic stone evaluation is neglected throughout. No author has reported a dedicated general approach in any country. This is in spite of good evidence that lifestyle and nutritional changes can indeed result in a reduction of urolithogenesis and thus the need for treatments [26, 27].

It has been shown that there is a strong relationship between the number of procedures performed at an institution and procedure-related morbidity and mortality [28]. Consequently, the general tendency in surgery is the formation of sub-speciality centers generating a caseload high enough to ensure highest quality of treatment. Such a process of creating sub-specialty centers was reported from nearly all countries, albeit it seemed more pronounced in government-regulated systems. Of course, as behind most policies, money saving is the driving force by concentrating expertise and technology in few places where they can be mastered most efficiently. Only more de-centralized semi-autonomous health systems as in Austria, Germany and France report – and seemingly can afford – a broad availability of all endourological equipment even in smaller units.

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