Journal of Surgery
Almeras C. J Surg 10: 11383
www.doi.org/10.29011/2575-9760.11383
www.gavinpublishers.com
Research Article

Ten-Year Trends in the Management of Urinary Stones in France : A Nationwide Retrospective Study Using Scansante open Data (2014–2023)

Christophe Almeras*

Department of Urology, UROSUD, RGDS La Croix du Sud Hospital, Quint Fonsegrives, France

***Corresponding author:** Christophe ALMERAS, Department of Urology UROSUD, RGDS La Croix du Sud Hospital, Quint Fonsegrives, France

Citation: Almeras C (2025) Ten-Year Trends in the Management of Urinary Stones in France : A Nationwide Retrospective Study Using Scansante open Data (2014-2023) J Surg 10: 11383 DOI: 10.29011/2575-9760.011383

Received Date: 09 July 2025; **Accepted Date:** 14 July 2025; **Published Date:** 16 July 2025

Abstract

Background/Objectives: To describe the evolution of urinary stone treatment techniques in France from 2014 to 2023 and evaluate the relationship between the incidence of nephritic colic and interventional management. **Methods**: A retrospective observational study was conducted using open-access ScanSante national data. All interventions for urolithiasis, including ureteroscopy, Flexible Ureteroscopy (FURS), renal and ureteral Extracorporeal Shock Wave Lithotripsy (ESWL), and Percutaneous Nephrolithotomy (PCNL) were analyzed over 10 years. Trends were assessed descriptively. Correlation between nephritic colic admissions and endoscopic interventions was measured using Spearman's coefficient.

Results: A total of 1,056,030 interventions were recorded. For renal stones, ureteronephroscopy represented 58.96% of cases, lithotripsy 39.1%, and PCNL only 1.94%. Ureteroscopy accounted for 89.81% of ureteral procedures. Over time, FURS use increased by 139%, while renal ESWL decreased by 43% especially with radiologic guidance. A strong inverse correlation was found between renal colic admissions incidence and ureteroscopic intervention rates (Spearman $\rho = -0.903$).

Conclusions: Endoscopic management of urinary stones has significantly increased in France over the past decade, with corresponding declines in renal colic admissions. These findings argue in favor of an overall economic efficiency of this shift in practice patterns despite a higher cost per procedure, but further studies are needed for validation.

Keywords: France; Lithotripsy; Nephritic Colic; Nephrolithotomy; Scansanté; Ureteronephroscopy; Ureteroscopy; Urinary Stone; Urolithiasis

Introduction

Urolithiasis affects a substantial proportion of the population (10%) and remains a major cause of emergency urologic admissions (1-2%). Urinary stone incidence seems to have increased in the last 20 years ; however, 50% of patients with urinary tract stones will have only one episode during their lifetime, and approximately 10% will present frequent recurrences [1-4]. A link between urinary tract stones and chronic kidney disease is becoming increasingly evident [5]. Quality of life is affected by renal colic episodes and other symptoms, but also by the number of interventions, ureteral stenting duration, and visits to the emergency department [6]. Over the last decade, and owing to its stone-free rates reaching up to 90% [7,8], its minimally invasive nature and the thriving technical improvements of endourological instrumentaiton (LASERs, baskets, access sheathes, vision quality, miniaturization, suction, …), Flexible Retrograde Ureteroscopy (FURS) is seeing a steady increase in its clinical indications in the treatment of renal stones to the detriment of other techniques (ESWL, PCNL) [9] and despite a primary higher cost [10,11] that could be nevertheless balanced by its cost effectiveness [12]. France's national ScanSanté database offers a unique opportunity to assess real-world practice at a population level [13]. This study analyzes 10 years of national data to assess trends in treatment techniques and their potential impact on acute presentations such as nephritic colic.

Materials and Methods

Study Design: This is a retrospective, descriptive study using national Open Data from ScanSanté (Ministry of Health) https://www.scansante.fr/applications/statistiques-par-groupes-diagnostique-actes [13]. The total of interventions for urinary stones performed in France between January 1, 2014, and December 31, 2023, were collected and analyzed, using procedural codes (Classification Commune Des Actes Médicaux (CCAM)) for Ureteroscopy, Extracorporeal Shock Wave Lithotripsy (ESWL), Percutaneous Nephrolithotomy (PCNL), renal colic (Table 1).

Location	Procedure	Specific Detail/Location	Imaging Modality	Code(s)
Kidney	FURS	Inferior calyx	–	JANE002
		Other	–	JANE005
	ESWL	–	Ultrasound	JANM002
		–	X-ray	JANM001
	PCNL	–	–	JAGF001-3, JAGD001-2
Ureter	Ureteroscopy	Lumbar	–	JCGE006
		Iliac	–	JCGE005
		Distal	–	JCGE001
		Antegrade	–	JCGE002
	ESWL	–	Ultrasound	JCNM001
		–	X-ray	JCNM002
Renal colic	–	–	–	N23

Table 1: Codes according to the urologic procedures ("–" indicates data not specified, Imaging modalities are listed where applicable.)

Outcomes

Primary: Evolution in the use of each procedure type from 2014 to 2023 in France. **Secondary:** Correlation between annual renal colic admissions and intervention rates.

Statistical Analysis

Descriptive statistics were conducted by a biostatistician, in accordance with the nature of the variables. Quantitative variables were described using frequencies, means, standard deviations, confidence intervals for the means, medians, minimum and maximum values, and interquartile ranges. They may also be presented in categorized formats (e.g., age groups) and described as qualitative variables based on quartiles, medians, or established clinical thresholds. Qualitative variables were described using frequencies, proportions, and, where appropriate, confidence intervals for the proportions calculated using Wilson's method. **The association between renal colic and ureteroscopies was assessed using Spearman's rank correlation coefficient with a 95% confidence interval,** as the rates of ureteroscopies and renal colic do not follow a normal distribution. SAS for Windows has been used for analysis (v 9.4; SAS Institute Inc).

Results

From January 2014 to December 2023, a total of 1,056,030 interventional procedures for urinary stones have been declared with 611,693 renal interventions (FURS 58,96%, ESWL 39,1%, PCNL 1,94%), 444,337 ureteral interventions (ureteroscopy 89,81%, ESWL 10,19%) and 360,406 renal colic that required institutional care (Figure 1).

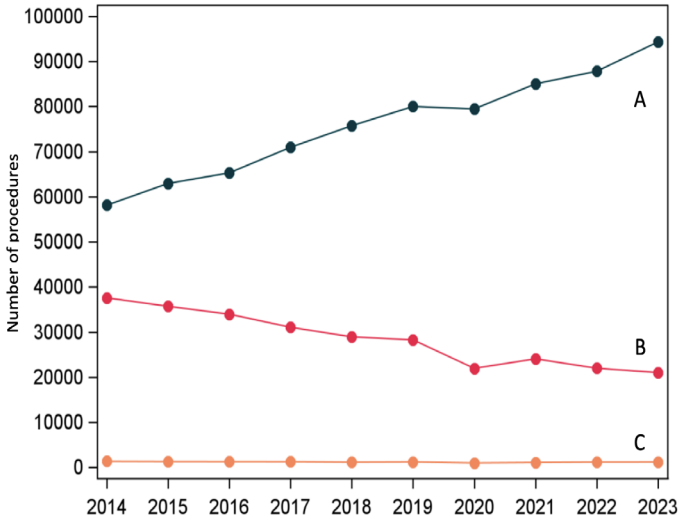

Figure 1: Distribution of procedures from jan 2014 to dec 2023; A: ureteroscopy and FURS; B: ESWL; C: PCNL.

Renal Stones Procedures Over Time

The total of FURS increased from 21,374 in 2014 to 51,003 in 2023 (+139%), as ESWL declined from 31,325 in 2014 to 17,919 in 2023 (-43%), especially concerning the radioguided technique and PCNL remained stable, representing 1,94% of renal procedures throughout the decade (Table 2, Figures 2,3).

Year	FURS			ESWL			PCNL	Total
	Inferior calyx	Other	Total	X-ray	Ultrasound	Total		
2014	14,168	7,206	21,374	22,882	8,443	31,325	1,331	54,030
2015	16,393	8,480	24,873	21,092	8,541	29,633	1,279	55,785
2016	18,441	9,817	28,258	19,918	8,625	28,543	1,253	58,054
2017	21,832	10,488	32,320	17,181	9,026	26,207	1,245	59,772
2018	24,258	11,550	35,808	15,605	8,837	24,442	1,147	61,397
2019	27,327	12,176	39,503	14,359	9,598	23,957	1,202	64,662
2020	26,681	11,530	38,211	10,453	7,765	18,218	979	57,408
2021	30,483	12,954	43,437	11,108	9,184	20,292	1,083	64,812
2022	32,403	13,462	45,865	9,902	8,733	18,635	1,171	65,671
2023	36,444	14,559	51,003	8,937	8,982	17,919	1,180	70,102

Note: Each column represents procedure counts per year, split by anatomical location and imaging modality where applicable.

Table 2: Annual volumes of renal interventions (jan 2014– dec 2023).

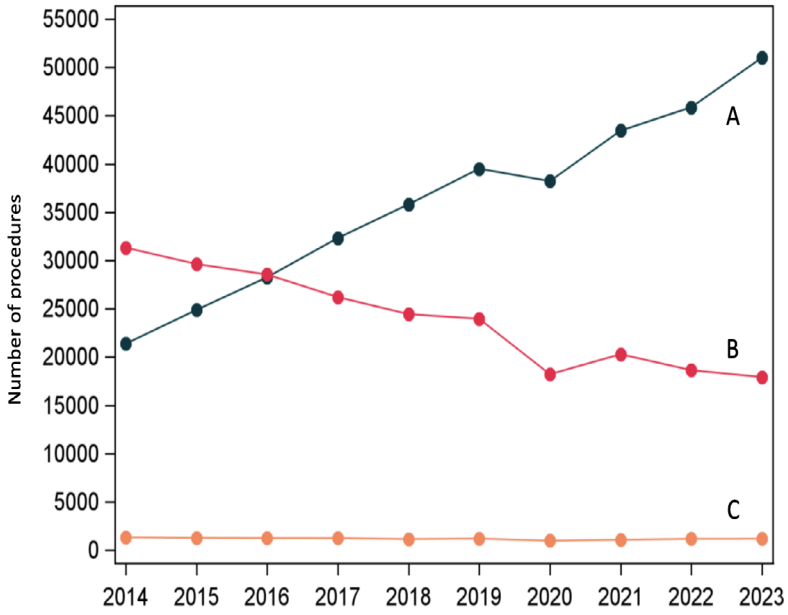

Figure 2: Distribution of renal procedures over time; A: FURS; B: ESWL; C: PCNL.

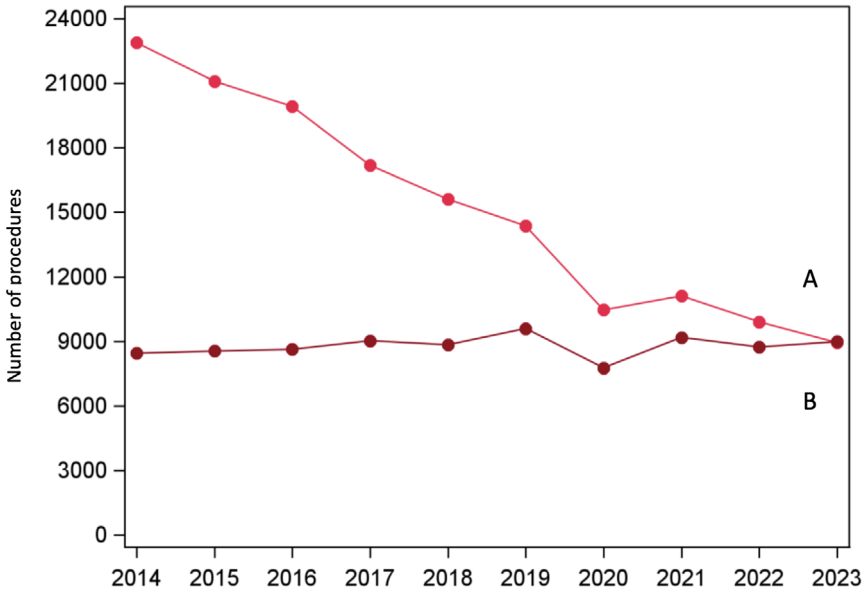

Figure 3: Distribution of ESWL over time; A: Xray guidance; B: Ultrasound guidance

Ureteral stones procedures over time

The volume of ureteroscopies rose from 36,743 (jan 2014) to 43,328 (dec 2023), and lumbar location was the most common (42–51%) (Table 3).

Year	Ureteroscopy				ESWL			Total
	Lumbar	Iliac	Distal	Antegrade	X-ray	Ultrasound	Total	
2014	15,589	5,755	15,254	145	36,743	5,248	6,248	42,991
2015	16,676	6,017	15,244	130	38,067	4,857	6,067	44,134
2016	16,162	6,000	14,689	178	37,029	4,138	5,413	42,442
2017	17,244	6,153	15,073	165	38,635	3,659	4,849	43,484
2018	18,343	6,506	14,925	154	39,928	3,242	4,486	44,414
2019	19,016	6,497	14,875	119	40,507	2,864	4,306	44,813
2020	20,011	6,421	14,652	170	41,254	2,449	3,727	44,981
2021	20,525	6,604	14,353	114	41,596	2,580	3,765	45,361
2022	21,147	6,442	14,208	169	41,966	2,250	3,326	45,292
2023	22,169	6,459	14,547	153	43,328	2,036	3,097	46,425

Note: The table details ureteral stone management by ureteroscopy (categorized by location and antegrade approach) and ESWL (by imaging modality).

Table 3: Annual volumes of ureteral interventions (jan 2014– dec 2023).

Renal Colic Events Over Time (Table 4)

Year	Renal colic
2014	38,403
2015	38,858
2016	37,384
2017	35,446
2018	36,505
2019	36,822
2020	34,830
2021	34,199
2022	34,312
2023	33,647
Total	**360,406**

The total of renal colic that required institutional care declined from 38,403 in jan 2014 to 33,647 in dec 2023 (−12.4%) with a strong inverse association with Spearman correlation (colics vs ureteroscopies): $\rho = -0.903$, 95% CI [−0.975; −0.603].

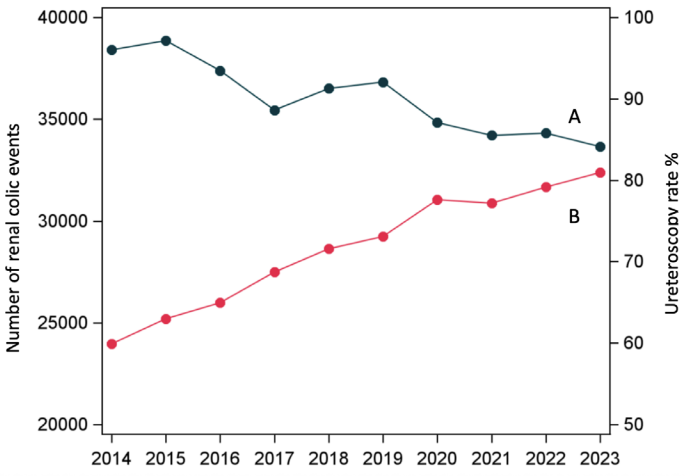

Figure 4: Renal colic events requiring institutional care over time and increasing ureteroscopies rate (jan 2014 - dec 2023); A: renal colic requiring institutional care; B: ureteroscopy and FURS; Spearman correlation (renal colic vs ureteroscopies): $\rho = -0.903$, 95% CI [−0.975; −0.603].

Discussion

This study confirms a steady increase of indications of FURS in France over the last decade in the treatment of renal stones , according to international guidelines [3,4], but to the detriment of ESWL especially [9] with an increase by 139%, while renal ESWL decreased by 43% in our study. PCNL remains stable with 1331-1180 procedures per year, but also a niche procedure (1.94% of the procedures over 10 years), reserved for complex or large renal stones in expert centers. The decline in the use of ESWL has occurred primarily at the expense of fluoroscopic guidance. This suggests that it may, in part, reflect its abandonment by centers equipped with suboptimal machines, where access to treatment is likely less structured and organized compared to centers using ultrasound-guided localization - an approach that requires both routine practice and a certain level of expertise. Another reason of this decline is the increasing population of patients under anticoagulant therapies, that remain a contraindication if unstoppable [4,14,15]. For the first time, an inverse relationship has been demonstrated between the increased use of ureteroscopy and a reduction in the number of renal colic events requiring institutional care. An increase of 62,31% of ureteroscopies over time was necessary to observe a 12,39% decrease of renal colics in our study. This decrease therefore concerns more severe cases and is likely underestimated, as the study was unable to account for milder episodes of renal colic, whether or not managed by general practitioners. A reduction in the overall incidence of renal colic events is thus likely contributing to an improvement of quality of life, and also a decrease in economic burden, including fewer sick leaves, reduced medical consumption (medications, emergency interventions), and fewer cancellations of planned activities such as travel or flights. Even this economic consequence remains very complex to estimate, these findings argue in favor of the overall economic efficiency of this shift in practice patterns, notwithstanding the higher cost per procedure [10,11]. The reduction of number of renal colic events is strongly statistically correlated with the increase in ureteroscopy procedures. It is likely due to improved stone-free rates [7,8], but also potentially attributable to the simultaneous treatment of associated asymptomatic stones during the same operative session. Sorensen has demonstrated that during endoscopic treatment of a stone, the concomitant treatment also of asymptomatic stones ≤ 6 mm reduced the recurrence risk by 82% (16% vs 63%), and increased the interval to recurrence by 75% (16.316 ± 72.8 vs 934.2 ± 121.8 days) [16].

However, there were some limitations in this study. First, inherent to the study's methodological design, there was a lack of clinical granularity (e.g., stone size or volume, stone composition, patient comorbidities), a risk of coding errors and that its observational nature could limit statistical causal interference. There was an obvious underestimation of the overall number of renal colic events, as the study was unable to account for milder episodes of renal colic, whether or not managed by general practitioners. Only severe renal colic events were traceable and have been taken into account; Second, concerning the renal colic events decrease, there could also be an interpretation bias related to the outcomes of the education and awareness efforts conducted by the French Association of Urology (AFU) during the same period, targeting urologists and nephrologists in France regarding the preventive management of lithiasis disease. [17,18]. This bias could be balanced by the documented urinary stone incidence's increasing trend among the population by epidemiologic studies [1-3].

Conclusions

This national analysis confirmed a major transformation in urinary stone management in France over the last decade. Retrograde endoscopic approaches are increasingly preferred, especially FURS, to the detriment of ESWL. For the first time, an inverse relationship has been demonstrated between the increased use of ureteroscopy and a reduction in the number of renal colic events requiring institutional care. These findings argue in favor of an overall economic efficiency of this shift in practice patterns despite a higher cost per procedure, but further studies are needed for validation.

References

1. Hesse A, Brändle E, Wilbert D, Köhrmann K-U, Alken P (2003) Study on the prevalence and incidence of urolithiasis in Germany comparing the years 1979 vs. 2000. Eur Urol 44: 709-13.

2. Fine JK, Pak CY, Preminger GM (1995) Effect of medical management and residual fragments on recurrent stone formation following shock wave lithotripsy. J Urol 153: 27-32; discussion 32-33.

3. Daudon M, Haymann J-P, Estrade V, Meria P, Almeras C (2023) Lithiasis Committee of the French Association of Urology (CLAFU). 2022 Recommendations of the AFU Lithiasis Committee: Epidemiology, stone analysis and composition. Prog Urol 33: 911-953.

4. Skolarikos A, Davis N, Jung HU, Lardas M, Neisius A (2025) et al. EAU guidelines Urolithiasis. 88: 64-75.

5. Zhe M, Hang Z (2017) Nephrolithiasis as a risk factor of chronic kidney disease: a meta-analysis of cohort studies with 4,770,691 participants. Urolithiasis 45: 441-448.

6. Bensalah K, Tuncel A, Gupta A, Raman JD, Pearle MS (2008) et al Determinants of quality of life for patients with kidney stones. J Urol 179: 2238-43; discussion 2243.

7. Mager R, Kurosch M, Höfner T, Frees S, Haferkamp A (2018) et alClinical outcomes and costs of reusable and single-use flexible ureterorenoscopes: a prospective cohort study. Urolithiasis 46: 587-593.

8. Geraghty R, Abourmarzouk O, Rai B, Biyani CS, Rukin NJ (2015) Evidence for Ureterorenoscopy and Laser Fragmentation (URSL) for Large Renal Stones in the Modern Era. Curr Urol Rep 16: 54.

9. Ordon M, Lantz Powers A, Chew BH, Lee JY, Kogon M (2024) et al. Incidence and trends in the treatment of kidney stones in Canada A population-based cohort study. Can Urol Assoc J 18: 158-164.

10. Talso M, Goumas IK, Kamphuis GM, Dragos L, Tefik T (2019) et al. Reusable flexible ureterorenoscopes are more cost-effective than single-use scopes: results of a systematic review from PETRA Uro-group. Transl Androl Urol 8: S418-25.

11. Talyshinskii A, Gauhar V, Castellani D, Knoll T, Shah K (2024) et al. Single use flexible ureteroscopes: a review of current technologies and cost effectiveness analysis. Curr Opin Urol 34: 110-115.

12. Wymer KM, Sharma V, Juvet T, Klett DE, Borah BJ (2021) et al. Cost-effectiveness of Retrograde Intrarenal Surgery, Standard and Mini Percutaneous Nephrolithotomy, and Shock Wave Lithotripsy for the Management of 1-2cm Renal Stones. Urology 156: 71-77.

13. https://www.scansante.fr/applications/statistiques-par-groupes-diagnostique-actes n.d.

14. Almeras C, Abid N, Meria P (2023) lithiasis committee of the French Association of Urology (CLAFU). 2022 Recommendations of the AFU Lithiasis Committee: Extracorporeal shock wave lithotripsy (ESWL). Prog Urol 33: 812-824.

15. Assimos D, Krambeck A, Miller NL, Monga M, Murad MH (2016) et al. Surgical Management of Stones: American Urological Association/ Endourological Society Guideline, PART II. J Urol 196: 1153-1160.

16. Sorensen MD, Harper JD, Borofsky MS, Hameed TA, Smoot KJ (2022) et al. Removal of Small, Asymptomatic Kidney Stones and Incidence of Relapse. N Engl J Med 387:506-513.

17. Almeras C, Estrade V, Meria P (2023) lithiasis committee of the French Association of Urology (CLAFU). 2022 Recommendations of the AFU Lithiasis Committee: Endoscopic description of renal papillae and stones. Prog Urol 33: 766-781.

18. Lemoine S, Dahan P, Haymann JP, Meria P, Almeras C (2023) Lithiasis Committee of the French Association of Urology (CLAFU). 2022 Recommendations of the AFU Lithiasis Committee: Medical management - from diagnosis to treatment. Prog Urol 33: 911-953.