TREATMENT INDICATION AND RESULTS FOR SINGLE ASYMPTOMATIC KIDNEY STONES < 10MM IN ADULTS

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Abstract

Background: At present there is not enough evidence to support final recommendations when small, single kidney stones are identified, either in asymptomatic patients or as residual stone fragments after an invasive procedure.

Aims: To describe the available evidence in relation to the prognosis and treatment of single kidney stones < 10 mm.

Methods: A retrospective review was carried out utilizing the PubMed, MEDLINE, and IMBIOMED databases.

Results: The collected information was organized into 2 groups: 1) single asymptomatic kidney stones < 10 mm as an incidental finding or identified through screening and 2) single residual kidney stones < 10 mm after a therapeutic intervention.

Conclusions: The authors recommend treating asymptomatic kidney stones that have a diameter ≥ 5 mm. Smaller stones should be under yearly surveillance once the patient has been informed about the risk for future events.

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Indicaciones y resultados del tratamiento de litiasis renal única asintomática menor de 10mm en adultos

Resumen

Introducción: No existe evidencia de primer orden que permita emitir recomendaciones inaplicables cuando se identifican litos únicos de pequeño tamaño, ya sea en pacientes asintomáticos o como litos residuales después de algún procedimiento invasivo.

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Objetivo: Describir la evidencia disponible sobre el pronóstico y tratamiento de litos únicos renales < 10mm.

Métodos: Revisión retrospectiva que incluyó las bases de datos PubMed, MEDLINE, IMBIOMED.

Resultados: Se describe el tratamiento para 2 grupos: 1) litiasis renal única < 10mm asintomática como hallazgo incidental o por escrutinio, y 2) litiasis renal residual única < 10mm después de intervención terapéutica.

Conclusiones: Los autores concluyen y recomiendan el tratamiento de litos renales asintomáticos siempre que tengan un diámetro ≥5mm. Aquellos de menor tamaño deben ser vigilados al menos anualmente previa discusión con el paciente sobre el riesgo de eventos futuros.

PALABRAS CLAVES
Litiasis; Renal; Tratamiento

Introduction

The incidence of urinary lithiasis has risen in the last decades. In the United States there has been an increase from 3.8 to 5.2%, when comparing the 1970s with the beginning of the 1990s.¹ In Mexico, during 1996 a prevalence of 5.5% was identified in the population of Yucatán,² considered an endemic zone.

The cause of a probable increase in urinary lithiasis prevalence worldwide has not been established. It has been proposed that the increase in the global temperature could have a role. Even the probable impact of global warming has been calculated for the future incidence of urinary lithiasis, predicted at up to 30% for 2050.¹ However, the use of techniques that are more sensitive than plain abdominal x-ray, such as ultrasound, and mainly, computed tomography (CT)⁴ has contributed to a higher frequency of primary detection of asymptomatic lithiasis and residual stones after a given therapeutic procedure.

In past decades, the term clinically insignificant stones was used to define stones under 5 mm that were considered low-risk for symptomatic events or future interventions.⁵ Nevertheless, this concept has recently been challenged and rejected. Unfortunately, there is not enough concrete evidence enabling final recommendations to be made when single small stones are identified, whether in asymptomatic patients or as residual stone fragments after an invasive procedure.

Given the above, the aim of our article was to gather the available evidence on treatment and prognosis of small, single kidney stones, exclusively those whose greatest diameters were < 10 mm, because they are the ones that cause the biggest therapeutic controversy.

Methods

A retrospective review was conducted that included the PubMed, MEDLINE, and IMBIOMED databases and all the articles from 1990 to 2013 in English or Spanish involving human adult patients. The search methodology is shown in figure 1. A total of 20 articles were identified and a narrative critical review of the identified articles was carried out. They were included in the present work at the authors’ criterion as a general review of the available literature.
progression was identified in 45.9% of the cases, 20% had spontaneous passage, and 7.1% required a procedure. Despite the variety of descriptions, it is a fact that fewer than 40% of identified asymptomatic stones remain stable and the rest can progress, causing symptoms and requiring additional intervention.

On the other hand, stone size is useful for stratifying patient risk. The studies by Koh et al. and Burgher et al. showed that stones under 4-5 mm in diameter have a higher spontaneous passage rate, meaning that those patients could be better candidates for yearly surveillance or surveillance every 6 months. The spontaneous passage rate was 3.6% for stones < 5 mm vs. 28% for larger stones.

Stone location influences their natural history. The same study by Burgher et al. reports that the 61% of the stones located in the lower pole had diameter growth versus 47% of the stones located in the middle and upper poles.

One of the few available prospective studies included 24 patients with lower-pole calyceal stones of a mean 8.8 mm. During the mean follow-up of 52 months, there was size progression in 33% of the patients and 11% required some type of procedure. Spontaneous passage of lower-pole calyceal stones < 5 mm was 50%; it was 16% for stones of 5 to 10 mm and it was absent in stones over 10 mm.

The abovementioned confirms that patients with lower-pole calyceal stones under 5 mm are the best candidates for surveillance. Active surveillance is appropriate for patients with stones over 5 mm and up to 10 mm, as long as they are made aware of the latent risk for progression in size, symptomatology, or the need for some type of operation. The follow-up methodology for asymptomatic kidney stones is controversial and it is not mentioned in controlled studies. Despite this isolated opinion, the majority of authors in recent works consider that the term clinically insignificant should be abandoned or at least redefined. Streem et al. identified a 43% rate for necessary procedure in 160 patients with post-ECL residual stones ≤ 4 mm during a mean prospective follow-up of 23 months. Likewise, in a retrospective analysis, Candau et al. identified a need for later treatment in 22% of patients with post-ECL residual stones of the same size during a mean 40-month follow-up period.

It is important to point out that the location of post-ECL residual kidney stones < 5 mm has also been mentioned as a probable predictive factor. Khaitan et al. reported that residual stones of the pelvis have a spontaneous passage rate of 53% with a mean 15-month follow-up, whereas the majority of stones in calyces were clinically significant because they required an intervention. Interestingly, the role of metabolic treatment when an alteration was found was analyzed and there was no significant difference in the behavior of residual stones.

There is only one prospective, randomized study on the treatment of post-ECL residual stones with a second ECL session. Despite having a reduced sample of 50 patients and follow-up with plain x-ray, the results suggest that systematic residual stone treatment may benefit patients, given that the presence of residual stones did decrease compared with the surveillance group. This proposal should be made in the context of a long discussion of the risks versus the benefits with the patient.

Likewise, we should stress that the use of CT has most likely enabled earlier diagnosis of residual stones under 5 mm because it has greater sensitivity than plain radiography. This could allow a more reliable residual stone follow-up, showing a less encouraging natural history than older reports.

**Residual stone fragments after a therapeutic procedure**

The term clinically insignificant residual stones refers to those remnants under 4 or 5 mm after a therapeutic intervention that do not cause symptoms and are not related to infection or a struvite component. Most of the literature focuses on residual stones after ECL, although there are some reports after percutaneous nephrolithotomy (PCNL) and ureteroscopy.

Rassweiler et al. carried out a literature review that in total represented approximately 14,000 patients. They found that up to 55% of the patients could remain asymptomatic with clinically insignificant residual stones and that any later treatment in asymptomatic patients should be considered over-treatment. They mentioned that only 4 to 25% of the patients would require a secondary procedure and that for the majority it would be ECL.

In contrast to this opinion, in the past decade more recent evidence is against the use of the term clinically insignificant residual stone, given that poorly favorable clinical progression has been reported for this type of pathology. For example, the study by El-Nahas et al. included 154 patients with evidence of asymptomatic stones under 5 mm after ECL. The mean follow-up period was 31 months and during that time 52.6% of the patients remained stable. However, only 13.6% had spontaneous elimination, 33.8% had an increase in size, and 48.7% required a procedure, mainly a second ECL or medical treatment for renal colic. Osman et al. conducted a retrospective study confirming that one-third of the patients with residual post-PCNL stones < 5 mm may require an operation due to stone size or symptomatology. It is important to emphasize the contemporaneity of this study, given that CT was utilized in the follow-up. An important fact of this analysis is that they identified that stones < 3 mm could really be considered clinically insignificant because no relation with complications or later procedures was identified.

Despite this isolated opinion, the majority of authors in recent works consider that the term clinically insignificant should be abandoned or at least redefined. Streem et al. identified a 43% rate for necessary procedure in 160 patients with post-ECL residual stones ≤ 4 mm during a mean prospective follow-up of 23 months. Likewise, in a retrospective analysis, Candau et al. identified a need for later treatment in 22% of patients with post-ECL residual stones of the same size during a mean 40-month follow-up period.

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There is only one prospective, randomized study on the treatment of post-ECL residual stones with a second ECL session. Despite having a reduced sample of 50 patients and follow-up with plain x-ray, the results suggest that systematic residual stone treatment may benefit patients, given that the presence of residual stones did decrease compared with the surveillance group. This proposal should be made in the context of a long discussion of the risks versus the benefits with the patient.

Likewise, we should stress that the use of CT has most likely enabled earlier diagnosis of residual stones under 5 mm because it has greater sensitivity than plain radiography. This could allow a more reliable residual stone follow-up, showing a less encouraging natural history than older reports.
Active surveillance of post-ECL residual stones is controversial. A recent review recommends considering follow-up with radiologic studies every 3, 6, or 12 months. Those authors agree with the abovementioned review in that optimum follow-up should be every 6 months due to evidence that the highest percentage of residual stone passage is seen at this interval. There is still no evidence justifying a cost-benefit yield with the use of serial tomography for the follow-up of these patients and therefore in our service post-ECL residual stone follow-up is generally carried out with plain abdominal x-ray. The active surveillance and natural history of post-PCNL residual stones has also been described. A retrospective study was conducted by Raman et al. on 42 patients with residual stones of a mean 3.1 mm after PCNL. With a follow-up of a mean 32 months every 6 months, 43% of the patients had an event that required an intervention. In a multivariate analysis, size greater than 2 mm and location in the pelvis predicted a greater risk for procedure-requiring events. Compared with post-ECL residual fragments, post-PCNL fragments appeared to have a greater risk for causing symptoms requiring a future procedure. We feel this could be explained by the fact that the patients that underwent PCNL had anatomic, metabolic, or functional conditions that put them at greater risk for lithiasis progression or persistence, compared with those that underwent ECL as primary treatment.

Although fewer, there are also reports of residual kidney stones after ureteroscopy/nephroscopy. Rebuck et al. described 51 patients with residual kidney stones < 5 mm that had a mean 18-month follow-up after ureteroscopy. A total of 19.6% of the patients required an operation during the follow-up. A comparative analysis reported that middle or upper calyceal location was the only predicting factor for an additional intervention. It is our opinion that these patients could be grouped together with the patients with post-ECL residual stones, probably because of the quantity of stone burden before the procedure and so they would appear to have less risk for a future event compared with the patients with post-PCNL residual fragments.

In relation to metabolic treatment in patients with post-intervention residual stones, there is stronger evidence in favor of active treatment. Likewise, treatment is supported for stones that are associated with urinary infections. In their studies, Soygür et al. and Kang et al. demonstrated that medical treatment reduced the risk for residual stone progression and recurrence, and it increased the stone-free rate during follow-up. In the same line of thought, we consider that medical treatment clearly benefits the patients that have undergone a procedure versus those with asymptomatic lithiasis, because the former most certainly have a more aggressive disease than the occasional episode in those patients with asymptomatic stones.

Conclusions

In conclusion, treatment of asymptomatic kidney stones is recommended when they have a diameter ≥ 5 mm. Smaller stones should be under at least yearly surveillance after the risk for future events has been discussed with the patient. The primary intention in patients with post-intervention residual kidney stones is to attain a stone-free status. The patients with the greatest risk for residual stones are those that underwent PCNL, followed by those that underwent ureteroscopy or ECL. For the latter group, surveillance every 6 months in residual kidney stones under 5 mm can be discussed. Metabolic medical treatment should always be utilized in post-intervention residual stone patients, and at present its systematic use is not justified in asymptomatic stones. CT is the best study for evaluating stone-free status, but plain radiography can still be used in selected patients.

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Conflict of interest

The authors declare that there is no conflict of interest.

References

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