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Review – Endo-urology

The Evolving Role of Retrograde Intrarenal Surgery in the Treatment of Urolithiasis

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Abstract

Context: Retrograde intrarenal surgery has gained substantial popularity worldwide thanks to continuous improvements in technology and techniques, and is now considered one of the first-line treatment options for active removal of renal stones.

Objective: To provide a comprehensive synthesis of the main evidences in literature on the current management of kidney stones by means of retrograde intrarenal surgery (RIRS).

Evidence acquisition: A review of literature has been conducted using search string “retrograde intrarenal surgery OR flexible ureteroscopia* OR ureterorenoscopia*”, without any language restriction; PubMed, Embase, and Scopus databases were searched in November 2016. Exclusion criteria involved manuscripts dealing with paediatric patients, and RIRS for proximal ureteric stones and for upper tract urothelial tumours. Fifty-seven papers were finally included in the analysis.

Evidence synthesis: Technological progress focuses on the miniaturisation of disposables and scopes, as well as on the increase of durability and improvement of the quality of image provided by these instruments. The technique has been in continuous development following the progress in technology. Currently, the main target of RIRS are renal stones 1–2 cm in size, even though tertiary centres are pushing the boundaries to the treatment of larger stones. Nomograms predicting surgical outcomes and improving preoperative surgical planning have been developed. RIRS has been shown to be safe and effective in patients with specific conditions such as bleeding diathesis, anatomical malformation, or pregnancy. Cost effectiveness of the approach is still a matter of controversy when compared with other treatment modalities.

Conclusions: RIRS is a well-established procedure under constant evolution with advances in technique and technology. It has gained worldwide popularity due to its minimal invasiveness and satisfactory outcomes. Future developments are needed to increase its cost effectiveness and extend its use to a wider range of indications.

Patient summary: In this collaborative review, we have summarised the best evidence in literature with respect to current management of renal stones by means of retrograde intrarenal surgery (RIRS) with flexible ureteroscopy. RIRS has been shown to be a safe and effective treatment modality in a wide spectrum of clinical scenarios; technology and technique are continuously evolving to further push boundaries of its indications and efficacy.

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1. Introduction

The concept of the endoscopic access to the renal collecting systems for the diagnosis and treatment of upper urinary tract diseases was firstly introduced by V. Marshall [1] who first described in 1964 the navigation in the renal pelvis with a rudimental flexible fibroscope. It has been only in the last 30 yr that miniaturisation and advances in technology have allowed a progressive improvement in techniques and their extensive employment in the clinical practice. Today, retrograde intrarenal surgery (RIRS) by means of flexible ureterorenoscopes (fURSs) is considered one of the first-line treatment options for the active removal of renal stones [2,3].

In this collaborative review, we aimed to provide a comprehensive synthesis of the main evidence in literature regarding the current role of RIRS for the treatment of renal stones.

2. Evidence acquisition

A review of literature has been conducted using search string “retrograde intrarenal surgery OR flexible ureteroscop* OR ureterorenoscop*”, without any language restriction; PubMed, Embase, and Scopus databases were searched

from inception to November 2016. Papers eligibility included systematic reviews, randomised controlled trials (RCTs), observational/longitudinal comparative studies, and cohort series; editorial, comments, or letter to the editors were excluded.

Exclusion criteria involved manuscripts dealing with paediatric patients as well as the use of RIRS for proximal ureteric stones and for upper tract urothelial tumours. A first screen for titles and abstracts of the articles was conducted by the first author (F.S.); the final list of manuscripts was agreed by senior authors in agreement with the first author and the supervising senior author (J.d.l.R.). Articles with the highest level of evidence and/or relevance provided in each subtopic of interest were included. A flow chart describing the selection process is shown in Fig. 1.

3. Evidence synthesis

3.1. Technology

During the last 3 decades, significant advances in technology improved the efficacy of RIRS with the use of fURSs. These advances include miniaturisation of the endoscopes and their improvement in terms of image quality and durability.

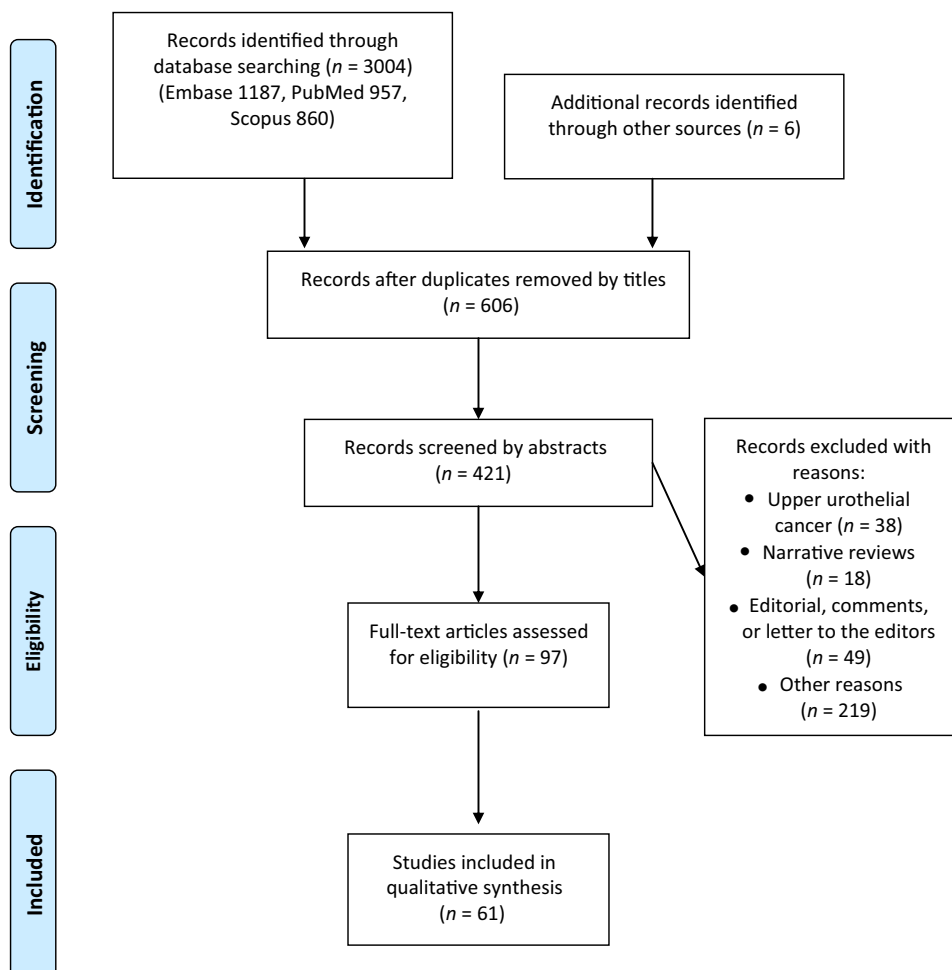


Fig. 1 – PRISMA 2009 flow diagram. PRISMA = Preferred Reporting Items for Systematic Review and Meta-analyses.

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