



## Research Article

# Outcomes of Endourology Procedures in Elderly Patients (> 85 Years) in A Regional Centre

Alice Nicol<sup>1,2\*</sup>, Marianna Zukiwskyj<sup>3</sup>, Nazim Ahmad<sup>4</sup>

<sup>1</sup>Department of Urology, Princess Alexandra Hospital, Brisbane, Australia

<sup>2</sup>University of Queensland, Brisbane, Australia

<sup>3</sup>Department of General Surgery, Logan Hospital, Brisbane, Australia

<sup>4</sup>St Stephens Hospital, Urraween, QLD, Australia

\*Corresponding author: Alice Nicol, Department of Urology, Princess Alexandra Hospital, Brisbane, Australia

**Citation:** Nicol A, Zukiwskyj M, Ahmad N (2023) Outcomes of Endourology Procedures in Elderly Patients (> 85 Years) in A Regional Centre. J Surg 8: 1929 DOI: 10.29011/2575-9760.001929

**Received Date:** 06 November, 2023; **Accepted Date:** 08 November, 2023; **Published Date:** 10 November, 2023

### Abstract

**Objectives:** In an aging population there is an increasing number of elderly patients diagnosed with urological conditions. Elderly patients undergoing surgical procedures are at greater risk of developing complications.<sup>1,2</sup> This analysis aims to evaluate the safety and efficacy of endourological procedures in an elderly patient population in a regional centre.

**Methods:** A retrospective chart review was undertaken of 49 patients aged 85 years or older who underwent endourological procedures under spinal or general anaesthesia at two hospitals in the Fraser Coast region in Queensland Australia between 2012 and 2015. Preoperative variables analysed included patient age, ASA classification, comorbidities and anticoagulant and antiplatelet medication use. The operative variables analysed were hospital length of stay, and post-operative complications

**Results:** There were 38 males (77.6%) and 11 females (22.4%). The mean age at time of operation was  $88.2 \pm 3.1$  years, median age was 87 with a range of 85 to 97. Twenty-eight patients (57.1%) had an ASA classification of three or above. Twenty patients (40.8%) had three or more significant comorbidities. A total of 49 procedures were performed, with 45 (91.8%) performed as elective procedures and four as emergency procedures. Transurethral resection of bladder tumour (TURBT) was the most commonly performed procedure. Ten patients experienced complications, which included urinary retention, haematuria, delirium and infection. One patient required transfer to a tertiary hospital.

**Conclusion:** There was no post-operative mortality and the majority of complications experienced were minor, advancing age should not be considered an absolute contraindication for endoscopic surgery.

**Keywords:** Complications; Endourology; Elderly; Regional

### Introduction

In an aging population there is an increasing number of elderly patients diagnosed with urological conditions. Elderly patients undergoing surgical procedures are at a greater risk of developing complications. [1,2] Prediction of surgical outcomes and perioperative risks in the elderly population is subjective, and there is a deficit in standardised and reproducible predictive tools. [2] Many tools fail to consider a patient's cognitive status and

physiological reserve. [2] Furthermore there is limited evidence on the safety of endourology procedures on patients in the extremely elderly patient (defined as age greater than 85 years), with most studies looking at patients aged over 65. It has been reported that up to 12% of patients with ureteric and renal stones are elderly. [3] Endoscopic management of stones up to 20mm is a recognised acceptable treatment option, and endoscopic management is often favoured for the elderly population as it is often considered to be less invasive. [3,4] Whilst endoscopic urological procedures are considered minimally invasive, they are not risk-free. [3] In the

aging population, surgical management of the elderly patient will become increasingly common in all surgical specialties, including urology. This analysis has been undertaken to evaluate the safety and efficacy of endourological procedures in an elderly patient population in a regional centre.

### Materials and Methods

A retrospective chart analysis was undertaken on consecutive patients aged 85 years or older who underwent endourological procedures under a spinal or general anaesthesia at two hospitals in the Fraser Coast region in Queensland. Patients were included if they underwent an endourological procedures under general or spinal anaesthesia between 2012 and 2015, and were aged 85 years or older at time of procedure. There was no exclusion criteria. A total of 49 patients were identified for analysis. Analysed primary outcomes included intraoperative and postoperative complications. Secondary outcome measured were hospital length of stay. Other variables analysed included age at time of operation, American Society Anesthesiologist grade (ASA grade), gender, procedure performed, comorbidities, anticoagulation status and antiplatelet status. Ethics approval was obtained from the UnitingCare Health's Human Research Ethics Committee and St Stephen's Hospital Hervey Bay director of Medical services, reference: 2015.35.178 on the 9/11/2015.

### Results

Of the 49 patients who underwent endourological procedures, 38 were male (77.6%) and 11 were female (22.4%). Excluding the transurethral resection of prostate (TURP) procedure (male specific), 24 patients were male (68.6%) and 11 were female (31.4%). The mean age at time of operation was 88.2 ± 3.1 years, with a range of 85 to 97. Twelve patients were aged over 90 years of age (24.5%). Twenty-eight patients (57.1%) had at least one severe systemic disease that was not incapacitating, constituting an ASA grade of three or above, with one patient having an ASA grade of four. Twenty patients (40.8%) had three or more significant comorbidities. Hypertension (30.6%) was the most frequently recorded comorbidity, followed by ischaemic heart disease (28.6%) and chronic obstructive pulmonary disease/ asthma (28.6%). Patient comorbidities are summarised in Table 1. A total of 27 patients (44.9%) were taking anticoagulant or antiplatelet medications. The most frequently recorded agent was aspirin (19 patients), followed by warfarin (4 patients). Of the patients taking antiplatelet or anticoagulation medication, five patients had their anticoagulation ceased and were bridged with either a heparin infusion or subcutaneous enoxaparin injections, and 21 patients ceased their medication without any bridging.

Demographics	Total n (%)
Total number of patients	49
Male:female total	38(77.6%) : 11(22.4%)
Male:female (excluding TURP)	24(68.6%) : 11(31.4%)
Mean age	88.2 +/- 3.1
<90	37 (75.5%)
90+	12 (24.5%)
ASA	
Grade 2	19 (38.8%)
Grade 3	26 (53.1%)
Grade 4	1 (2%)
Not recorded	3 (6%)
Medical comorbidities	
Hypertension	15 (30.6%)
Ischaemic heart disease	14 (28.6%)
Malignancy	3 (6.1%)
Chronic obstructive pulmonary disease/ Asthma	14 (28.6%)
Atrial Fibrillation	7 (14.3%)
Heart failure	6 (66.7%)
Valve replacement	5 (10.2%)
Diabetes	3 (6.1%)
Hypothyroidism	2 (4.1%)
Chronic kidney disease	4 (8.2%)
High cholesterol	3 (6.1%)
Malignancy	3 (6.1%)
Cerebrovascular accident/transient ischaemic attack	5 (10.2%)
Permanent pacemaker	2 (4.1%)
Osteoarthritis	3 (6.1%)
Cognitive impairment	2 (4.1%)
Pulmonary Embolism	1 (2%)
Rheumatoid arthritis	1 (2%)

Conscious Ventricular tachycardia	1 (2%)
Carotid stenosis	1 (2%)
Anticoagulation status	
Aspirin	19 (38.8%)
Assasantin	1 (2%)
Clopidogrel	3 (6.1%)
Warfarin	4 (8.2%)
Withheld preop	21 (42.9%)
Bridged with clexane/heparin	5 (10.2%)
Elective : emergency	45(91.8%) : 4 (8.2%)

**Table 1:** Patient characteristics.

Of the 49 procedures, 45 (91.8%) were performed as elective procedures and four as emergency procedures. The majority of patients (89.8%), had the procedure performed under a general anaesthetic, with five patients (10.2%) undergoing spinal anaesthesia. All patients undergoing spinal anaesthesia were aged under 90 years, with a mean age of 87.4 years +/- 1.14. Of the five patients having a procedure under spinal anaesthetic, four patients had an ASA grade of two, and only one patient had an ASA grade of four. Patients had between one and five recorded medical comorbidities, and the mean hospital stay was 1.4 days +/- 0.56. Patients undergoing procedures under general anaesthesia had a mean age of 88.25 +/- 3.25 years, with 12 patients aged 90 years or older. Of the 44 patients undergoing a procedure under a general anaesthetic, 16 patients (36%) had an ASA grade of two, 26 patients (59%) had an ASA grade of three and two patients did not have ASA grade recorded. Transurethral resection of bladder tumour (TURBT) accounted for 38.8% of procedures, and TURP accounted for 28.6%. Cystoscopy accounted for 20.4% of procedures, with five patients also undergoing a bladder biopsy. Table 2 summaries the procedures performed.

Anesthesia	
General anesthesia	44
Spinal anaesthetic	5 (10.2%)
Procedure performed	
TRUP	14
TURBT	19
>2cm tumour	8
<2cm tumour	11
Ureteroscopy + biopsy + stent	1
Lithotripsy	2
Ureteric stent insertion	2
Optical urethrotomy	2
Cystoscopy total	9
With biopsy	5
With bladder washout	1
With urethral dilatation	2
With removal of bladder stone	1
Mean hospital stay (range)	2.1 days (0-9 days)
TURP	3.4 days
TURBT	1.9 days

**Table 2:** Operative data.

The overall mean hospital stay was 2.1 ± 2.1 days. Patients without post-operative complications had an average length of stay of 1.6 days, with a range of zero to nine days. For patients undergoing TURP, mean hospital length of stay was 3.4 days (range 1-9 days), and for those undergoing TURBT, mean hospital length of stay was 1.3 days (range 1-8 days). The overall complication rate was 20.4%, with ten patients experiencing complications. The mean age of patients experiencing post-operative complications was 90.4 years. No patient required a return to theatre. One patient required transfer to a metropolitan tertiary hospital for ongoing

management of upper tract obstruction, two months following incomplete TURBT due to anaesthetic concerns and co-morbidities. The most frequently experienced complications were failing a trial of void (TOV) and haematuria. A total of four patients, with a mean age of 89, failed a TOV (8.1%), of which three were male and one was female. Of the patients who failed a TOV, two patients were following a TURP, one was following an incomplete TURBT and one was following an emergency cystoscopy for haematuria. Four patients (8.1%) experienced haematuria post procedure, all of whom were male, with an average age of 91. One patient, an 86 year old male, whose anticoagulation had been ceased, required a blood transfusion for haematuria following a TURP. Three patients were readmitted post procedure. A 96 year old female represented two months following an incomplete TURBT with upper tract obstruction, and given anaesthetic concerns was transferred to a metropolitan tertiary hospital. An 88 year old male represented five days following a TURP with an acute kidney injury secondary to urinary retention. A 93 year old male represented three weeks following a TURBT with haematuria requiring a two day admission. Patient complications are summarised in Table 3. A subgroup analysis of patients aged 90 years or older, revealed all twelve patients received general anaesthesia. Four patients (33%) had an ASA grade of two, Six patients (50%) had an ASA grade of three, and the remaining two did not have an ASA grade recorded. The patients had a mean hospital length of stay of 3.25+/-2.18 days. Four patients (33.3%) experienced complications, and two of these patients required readmission after initial discharge. Mean number of medical comorbidities recorded was 2.3, with Chronic obstructive pulmonary disease (COPD)/asthma being the most frequently recorded in five patients.

Age	Gender	Procedure	complication
96	Female	TURBT	Presented 2 months post incomplete TURBT with upper tract obstruction requiring transfer to metropolitan hospital
97	Male	TURBT	Delirium superimposed on dementia
88	Male	TURP	Representation 5 days post TURP with acute kidney injury secondary to urinary retention
88	Male	TURP	Haematuria with urinary retention post trial of void
93	Male	TURBT	Representation 3 weeks post TURBT with haematuria
86	Male	TURP	Ongoing haematuria post TURP performed for haematuria requiring 1 unit pRBC
90	Male	TURP	Failed TOV
85	Male	TURP	Failed TOV
96	Female	TURBT	Failed TOV post incomplete TURBT
85	Male	Cystoscopy	Failed TOV post cystoscopy for haematuria

**Table 3:** Complications.

## Discussion

Demographic projections predict that by 2050, 21.1% of the worlds population will be aged 60 years or older. [5] In Australia, it is projected that by 2066 up to 4.4% of the population will be aged 85 years and older. [6] With an aging population and increasing life expectancy, there will continue to be an increasing need to perform surgical procedures in the elderly cohort. It is therefore important to ascertain whether surgical risk can be combined with patient frailty without unnecessarily increasing post-operative morbidity and mortality. A retrospective review by Leung and Dzankic of 544 patients aged over 70 undergoing all non cardiac surgical procedures demonstrated an overall complication rate of 21%. [7] They were able to demonstrate that the most important predictors of post operative complications were ASA grade, emergency surgery and intraoperative tachycardia. [7] Aykac and

Baron conducted a retrospective review of 336 patients aged over 65 years of age undergoing retrograde renal surgery for stone, including 29 patients aged over 85 years. [5] In this series, the reported overall complication rate for patients aged over 85 years was 41.4%, however all complications in this group were classified as clavien-dindo one or two, and therefore considered minor. [5] Their series had a higher proportion of patients with ASA grade over two, with 31% of patients having ASA grade of four, and 65% having ASA grade of 3 [5].

A retrospective review by Berardinelli et al, looked at male patients undergoing retrograde renal surgery for stones. [3] It included 308 patients aged under 65 years, and 91 patients aged over 65 years. The mean age of the older cohort was 72.1 years. [3] They reported an overall complication rate in the older age group of 9.8% which was lower than the overall complication

rate of 14.2% in the younger (age < 65) cohort. [3] Emiliani et al conducted a retrospective review of 80 patients aged over 80 years and 78 patients aged under 80 years undergoing retrograde renal surgery for stone disease. [4] The review reported higher ASA scores in the elderly group, with higher rates of medical comorbidities and anticoagulation use. [4] Despite higher rates of comorbidities, there was no statistically significant difference in reported post operative complication rates, with patients aged over 80 years having a complication rate of 9.5%, and those under 80 years having a complication rate of 7.7% (p=0.682). [4] A retrospective series by Juliebo-Jones et al, consisted of 51 patients aged over 85 years of age undergoing 64 ureteroscopic procedures for stone disease. [8] They reported an overall complication rate of 41%, with 13% experiencing complications prior to discharge, and 28% experiencing late complications. [8] The majority of the complications were minor, with only 23% of the complications being clavien-dindo three or above, and the most frequently reported complication in this series was urinary tract infection. [8] This series reported no deaths within 30 days of procedure, however reported four deaths within 90 days of procedure, and 23% of the patients were dead at one year post procedure. [8] All deaths were attributed to exacerbations of underlying medical conditions, rather than a consequence of surgery [8].

In our series, outcomes of endoscopic urological procedures in patients aged 85 years and older were evaluated. Both elective and emergency procedures were included in this series, however the majority of procedures were elective. Only one patient required transfer to a metropolitan hospital, and the remaining complications were managed conservatively without need for transfer. The overall complication rate in our cohort of 49 patients undergoing endourological procedures in a regional centre was 20.4%. Given that the majority of complications were minor, we believe that endoscopic procedures are a safe and effective option for geriatric patients. The literature on complication rates in elderly patients is heterogenous, as the author decides the age range of a cohort. Complication rates in the elderly cohort in the literature ranges from approximately 10-40%. For this study the follow up period was only two months, which may not capture mortality or morbidity as a result of an exacerbation of a medical condition or as a result of their surgical procedure and anaesthetic. Another limitation of this study could be the possible patient selection bias, compared to similar studies this series had a higher proportion of patients with ASA two or less. Our complication rate of 20.4% is similar to the 21% demonstrated by Leung and Dzankic, however, they included patients aged 70 and over and included all non-cardiac surgery, some of which may have an inherently higher complication rate than endourological procedures. When comparing only endourological series, our complication rate is higher than the 7.7% and 9.8% demonstrated

by Emiliani et al and Berardinelli et al, however lower than the 41% and 41.4% demonstrated by Juliebo-Jones et al and Aykac and Baron. The majority of our patient cohort were classified ASA two or three, with only one patient having an ASA grading of four, with most frequently recorded comorbidity being hypertension. Other series have reported a higher rate of ASA three and four patients.

Selection bias for surgical intervention, based on patient comorbidities, exists regardless of patient age. The difficulty in balancing surgical risk versus benefit in the elderly cohort, is that the long-term benefit is less quantifiable, especially in minimally symptomatic conditions. Many in an elderly cohort have already exceeded the average life expectancy for their generation. Many will have competing pathologies which, if present long enough, will affect morbidity and mortality, but it is difficult to pinpoint when. The elderly patient may be 'selected out' of surgical intervention at several points along their medical journey. A patient may select themselves out, by considering new ailments a consequence of their age and a perception that either they are too elderly or frail for intervention, or that there will be no significant long-term benefit in treating their condition. General practitioners and primary care physicians may also make similar assessments and therefore not refer on for specialist treatment. In some cases this would be appropriate, however it would be unfortunate if age alone were the primary consideration. Surgeons will also select out patients based on comorbidities, life expectancy, anaesthetic risk, risk calculators of mortality and morbidity and symptomatology with the same procedure in the more symptomatic patient considered a more acceptable risk, if all other factors remain the same.

## Conclusion

This was a small retrospective case series of an elderly cohort of patient undergoing endourological procedures. The overall complication rate of 20.4%, with the majority of complications being relatively minor. There was no mortality and no patient required a return to theatre. One patient required transfer for peri-operative management. Our complication rates were similar to previous studies looking at elderly populations, many of which included a younger cohort of patients. Overall, endoscopic procedures in the elderly population are relatively safe, and advanced age should not be considered an absolute contraindication for endoscopic surgery.

## References

1. Drach GW, Griebing TL (2003) Geriatric urology. *J Am Geriatr Soc* 51: S355-358.
2. Revenig LM, Canter DJ, Taylor MD (2013) Too frail for surgery? Initial results of a large multidisciplinary prospective study examining preoperative variables predictive of poor surgical outcomes. *J Am Coll Surg* 217: 665-670 e1.

3. Berardinelli F, De Francesco P, Marchioni M (2017) RIRS in the elderly: Is it feasible and safe? *Int J Surg* 42: 147-151.
4. Emiliani E, Piccirilli A, Cepeda-Delgado M (2021) Flexible ureteroscopy in extreme elderly patients (80 years of age and older) is feasible and safe. *World J Urol* 39: 2703-2708.
5. Aykac A, Baran O (2020) Safety and efficacy of retrograde intrarenal surgery in geriatric patients by age groups. *Int Urol Nephrol* 52: 2229-2236.
6. (2023) Statistics ABo. Populations Projections, Australia.
7. Leung JM, Dzankic S (2001) Relative importance of preoperative health status versus intraoperative factors in predicting postoperative adverse outcomes in geriatric surgical patients. *J Am Geriatr Soc* 49: 1080-1085.
8. Juliebo-Jones P, Moen CA, Haugland JN (2023) Ureteroscopy for Stone Disease in Extremely Elderly Patients (>=85 Years): Outcomes and Lessons Learned. *J Endourol* 37: 245-250.