



Best Practice

Evidence based information sheets for health professionals

Removal of short term indwelling urethral catheters

Recommendations for practice

These recommendations are based on statistically significant findings of the review. There is a need for further studies to strengthen these findings as most of the implications are based on single studies.

Timing of removal

- Following urological procedures and surgery, including gynaecological surgery, removal of the IUC at midnight is recommended. **(Grade A)**

Duration of catheterisation

- Early removal of IUC is associated with a reduced risk of urinary tract infection and shorter hospital stay, but greater risk of short-term voiding problems. **(Grade B)**

Clamping of IUC

Due to the limited evidence obtained from the review this recommendation is based on findings relating to important patient outcomes.

- Removal of the IUC following a period of free drainage for 24 hours is recommended. **(Grade D)**

Information Source

This *Best Practice* information sheet has been derived from a systematic review of research published by the Joanna Briggs Institute entitled "Comparison of late night and early morning removal of short-term urethral catheters: a systematic review"¹ and another published in the Cochrane Library titled "Policies for the removal of short term indwelling urethral catheters".² The primary references on which this information sheet is based are available in the systematic review reports available from The Joanna Briggs Institute www.joannabriggs.edu.au and the Cochrane Library.

Background

Short-term use of an indwelling urethral catheter (IUC) is a safe and effective strategy in the maintenance of bladder and renal health and judicious use contributes to improved outcomes. However, insertion of an IUC is not without complications. Catheter associated bacteriuria is common and increases by five to eight percent each day during the period of catheterisation. Other complications include structural damage to the urinary tract, bleeding,

creating a false passage, urinary retention, and patient discomfort.

While the importance of short-term IUC management is recognised, there is no consensus among clinicians about the optimal time of day for IUC removal, the length of time that the IUC is left in place, or if clamping the IUC prior to removal influences patient outcomes.

Objectives

To determine the best strategies for the removal of short-term IUCs in adult patients with this device.

The following comparisons were investigated

- removal of the IUC at one time of the day is better than at another time

Grades of Recommendation

These Grades of Recommendation have been based upon the JBI developed *Grades of Effectiveness*³

- Grade A** Effectiveness established to a degree that merits application
- Grade B** Effectiveness established to a degree that suggests application
- Grade C** Effectiveness established to a degree that warrants consideration of applying the findings
- Grade D** Effectiveness established to a limited degree
- Grade E** Effectiveness not established

Definition of terms

For the purpose of this *Best Practice* Information Sheet the following definitions were used:

Short term IUC catheter inserted for a period of 1-14 days.

Early morning removal removal of the IUC between 6am and 8am.

Late night removal removal between 10pm and midnight.

- removal after a shorter duration of IUC use is better than after a longer duration
- removal of a IUC after a period of clamp and release is better than removal of a free-draining IUC

Inclusion criteria

All randomised and quasi-randomised controlled trials evaluating the effects of practices undertaken for the removal of short-term IUCs in people of all ages and in any setting (hospital, community, nursing home) were included in the review.

Exclusion criteria

Trials that involved suprapubic catheters, intermittent catheterisation and removal of nephrostomy and suprapubic tubes.

Removal of the IUC at one time of day versus another time

Eight trials involving 1020 patients compared IUC removal at different times of the day in patients following urological surgery and procedures, gynaecological surgery all with acute urinary retention. However, meta-analysis was restricted due to the limited information available and clinical heterogeneity between the trials.

Time to first void (*n=6 trials*)

This varied widely between individual patients (eg 10 minutes to 13 hours 15 minutes). In five trials, the time to first void was longer, significantly so in three trials, in the groups allocated midnight removal. The exception was a trial following gynaecological surgery when the time was significantly shorter after removal at midnight ($p=0.012$).

Volume of the first void (*n=7 trials*)

The volume of the first void ranged from five to 600 ml and this was reflected in large standard errors and standard deviations reported in the trials. In all seven trials, patients whose IUCs were removed at midnight passed significantly larger volumes at their first void, irrespective of reason for initial catheterisation.

Length of hospitalisation (*n=7 trials*)

Six of the seven trials reported shorter length of hospitalisation following removal of the IUC at midnight. The remaining trial reported on the time to discharge decision and showed no difference in this outcome between the groups. In the four trials providing adequate data, discharge was delayed in a third of participants after morning IUC removal (RR 0.67; 95% CI 0.59 to 0.75). In a fifth trial the median hospital stay was two days shorter in the group allocated midnight removal; secondary analysis suggested that this difference may be greater when catheterisation followed gynaecological surgery involving the bladder or urethra.

Need for recatheterisation for urinary retention (*n=6 trials*)

Overall, 46/716 allocated midnight removal compared with 60/695 allocated morning removal were recatheterised (RR 0.82; 95% CI 0.58 to 1.16).



Time of day recatheterised (*n=2 trials*)

The time between initial removal and recatheterisation ranged from seven to 80 hours. One trial reported that patients whose IUCs were removed at night were more likely to be recatheterised during working hours (but statistical significance was not stated).

IUC not removed on time (*n=3 trials*)

In two of the three trials, a greater number of IUCs were removed on time when scheduled for midnight removal compared to morning removal. In the third trial, however, fewer IUCs scheduled for midnight removal were removed on time.

Cost-effectiveness (*n=1 trial*)

The only trial that investigated this outcome reported that the reduced length of stay for patients whose IUCs were removed at midnight resulted in an annual saving of 17 bed-days a year, which was equivalent to an annual saving for the unit of UK £1500.

Patient satisfaction (*n=6 trials*)

Five trials reported that midnight removal of IUCs did not interrupt the patients' sleep; some patients went back to sleep immediately after the catheter was removed, and the others slept through the removal process. The sixth trial indicated that patients whose IUCs were removed at

midnight had disturbed sleep, were tired and confused in the morning and had a delayed establishment of voiding pattern. One trial indicated that following morning removal, recatheterisation occurred in two of the three patients at “unsocial hours” (20.30 and 03.00 hours) which was not only distressing for the patient but was also performed by a doctor who was on call and not familiar with the case.

Shorter duration versus longer duration of IUC use

Eight trials involving 122 patients investigated the effects of duration of catheterisation on outcomes following treatment for urethral strictures, acute retention of urine, surgery for urinary stress, transurethral surgery and rectal surgery.

Short-term urinary retention/delayed voiding after IUC removal (*n=4 trials*)

In all four trials that reported this outcome, the clinical indications varied, the numbers allocated to the various policies compared were small, and the confidence intervals were all wide. Significantly fewer participants had short term urinary retention following rectal resection when the IUC removal was delayed for five days but this observation largely relies on a single trial.

Number of patients who required recatheterisation (*n=3 trials*)

The confidence intervals were wide in all three trials, reflecting the small number of events in the comparisons, and none of the differences observed were statistically significant.

Chronic urinary retention (*n=2 trials*)

Between the two trials that investigated this outcome there were only 13 cases of chronic retention with similar numbers originally managed with early or delayed IUC removal.

Urinary tract infection (*n=5 trials*)

The data in these five trials were few, but were consistent with an increasing risk with later removal, irrespective of gender.

Urethral pain and discharge (*n=1 trial*)

Following urethrotomy, none of the 20 patients in the early removal (3 days) group reported urethral pain and discharge compared with two amongst the 20 in the late group (28 days).

Secondary haemorrhage (*n=1 trial*)

A single case of secondary haemorrhage was reported in 30 patients whose IUCs were removed after two days following TURP compared with none amongst 29 whose catheters were removed after one day.

Deep vein thrombosis (DVT) (*n=1 trial*)

A single case of DVT was reported in patients (*n=29*) whose IUCs were removed after one day compared with none when the IUC was removed after two days (*n=30*) following TURP.

Epididymitis (*n=1 trial*)

Two of 20 patients whose catheters were removed 28 days after urethrotomy developed epididymitis compared with none of 20 in the three-day removal group.

Recurrence of strictures (*n=2 trials*)

Recurrence of strictures in patients whose IUCs were removed after either three days (*n=20*) or 28 days (*n=20*) following urethrotomy, occurred in six patients, (three in each group) at the six month follow up and in eight patients (four in each group) at the 12 month follow up. These results were not significant. Likewise, no statistically significant difference was reported in this outcome if the IUC was removed after one or 14 days following urethrotomy.

Long-term urinary complications (*n=1 trial*)

No statistically significant difference was reported in this outcome in patients whose IUCs were removed after one or five days following proctectomy (10/64 versus 5/62).

Length of hospitalisation (*n=3 trials*)

All three trials favoured early removal of the IUCs, however the results were statistically significant in only two trials ($p < 0.001$).

Patient satisfaction (*n=1 trial*)

A larger proportion of the patients who had been catheterised for one day were satisfied with their treatment compared with those who were catheterised for 14 days, although the results were not statistically significant (RR 0.72; 95% CI 0.45 to 1.17).

Clamping versus free drainage before IUC removal

Three trials involving a total of 234 patients, mainly women, compared clamping the IUC prior to removal with free drainage. All three trials used different clamping regimens; therefore the results could not be combined in a meta-analysis.

The data in all comparisons were few and hence the confidence intervals were all wide.

Urinary tract infection (*n=1 trial*)

No statistically significant difference in this outcome was reported in patients whose IUCs were removed after a period of clamping (3/33) or following free drainage for 24 (3/37) or 72 hours (6/36).

Urinary retention (*n=1 trial*)

No statistically significant difference in this outcome was reported in patients whose IUCs were removed after a period of clamping (14/33) or following free drainage for 24 (9/37) or 72 hours (11/36).

Recatheterisation (*n=1 trial*)

No statistically significant difference in this outcome was reported in patients whose IUCs were removed following prior clamping (2/33) or following free drainage for 24 (1/37) or 72 hours (3/36).

Time to first void (*n=2 trials*)

In both trials, time to first void was significantly shorter in patients whose indwelling catheters were removed after prior IUC clamping.

Implications for research

This review has provided a guide to future priorities for research.

1. Further randomised trials using larger sample sizes are needed to address all the questions in the review more precisely and reliably, and to allow secondary analyses amongst discrete subgroups.
2. Further trials should include the range of outcomes sought in this review, including measures of quality of life and resource use.
3. Outcome measures (eg urinary retention) need to be well defined to increase the robustness of further trials. The main issues are the need for recatheterisation and time to hospital discharge.
4. Evaluation in wider settings and on specific groups of patients would enhance generalisability.
5. Future randomised trials should compare the effects of midnight or early morning indwelling urethral catheter removal to removal at any time of the day.
6. Similarly, randomised trials using larger samples are needed to provide robust evidence of the effects of clamping or free drainage of the indwelling urethral catheters, and adjunctive use of alpha blockers, prior to removal.

Implications for practice

There is suggestive, but inconclusive evidence that midnight, rather than early morning, catheter removal may lead to shorter hospital stays with consequent resource savings. The evidence does suggest that the timing of catheter removal is a balance between avoiding infection (by early removal) and circumventing voiding dysfunction (by later removal). Early removal appears to reduce mean hospital stay. The evidence for assessing clamping indwelling urethral catheters prior to removal is limited. Until stronger evidence becomes available practices relating to clamping indwelling urethral catheters will continue to be dictated by local preferences and cost factors.

Postoperative voiding dysfunction (*n=1 trial*)

Clamping, or free drainage of the IUC prior to removal did not impact on the incidence of postoperative voiding dysfunction (RR 0.74; 95% CI 0.44 to 1.24).

Acknowledgments

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This *Best Practice* information sheet has been reviewed by nominees of International Joanna Briggs Collaborating Centres.

References

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