Audit of safety, efficacy, and cost-effectiveness of local anaesthetic cystodiathermy

Kim Davenport, Francis X Keeley Jr, Anthony G Timoney

Bristol Urological Institute, Southmead Hospital, Westbury-on-Trym, UK

ABSTRACT

INTRODUCTION The aim of this study was to audit our experience of cystodiathermy under local anaesthetic (LA) at the time of flexible cystoscopy for recurrent superficial bladder transitional cell carcinoma (TCC).

PATIENTS AND METHODS A total of 264 flexible cystoscopies were performed on patients with a past history of TCC. The number and site of recurrences were recorded and selected patients were offered cystodiathermy. Patient tolerability was noted. At follow-up, any recurrence was recorded.

RESULTS Eighty patients (30%) had 91 procedures showing one or more recurrences. Fifty-one of the 80 patients (64%) were treated with cystodiathermy under LA. All completed treatment. Forty-five (88%) tolerated the procedure well. Forty-seven (92%) treatments were completed within 5 min. At a median follow-up of 15 weeks, 30 (59%) treated patients had no recurrence and three (6%) had recurrence at the site of treatment.

CONCLUSIONS LA cystodiathermy is an effective and well-tolerated alternative to general anaesthetic cystodiathermy that enables treatment at the time of detection and may, thereby, reduce patient anxiety.

KEYWORDS

Bladder – Cystodiathermy – Laser – Recurrence – Superficial – Transitional cell carcinoma

Accepted 14 June 2010; published online 2 July 2010

CORRESPONDENCE TO

Kim Davenport, Bristol Urological Institute, Southmead Hospital, Westbury-on-Trym, Bristol BS10 5NB, UK
E: DrKimDav@aol.com or davenk@doctors.org.uk

Flexible cysto-urethroscopy is a well-established method of surveillance for superficial bladder transitional cell carcinoma. Since 55–90% of G1pTa tumours recur within 5 years but less than 5% invade or cause death,^{1–5} the majority of these patients will require multiple procedures following diagnosis with or without recurrent admissions to treat recurrences. As the majority of recurrences are small, the ideal treatment would be one which can be performed as a day-case under local anaesthesia and is well tolerated without affecting patient satisfaction or disease progression. Day-case treatment is associated with a reduction in costs by limiting the number of patients requiring in-patient treatment. Repeated general anaesthesia should also be prevented, if possible, since the majority of the population affected are also at risk of age-related cardiac and respiratory disorders.

The options for day-case treatment include cystodiathermy^{6–8} and laser vaporisation using either the holmium:YAG^{9,10} or neodymium:YAG laser¹¹ at flexible cystoscopy. All

three methods of treatment have been found to be clinically effective and well tolerated. Same-site recurrence rates have been reported at 10–12.6%.^{10,12} Cystodiathermy would be more cost-effective compared to laser vaporisation if it had similar efficacy due to the additional risks and costs associated with laser use.

Since 2003, LA cystodiathermy has been offered to those patients with small, usually solitary, recurrences, at the time of review flexible cystoscopy with the aim of avoiding unnecessary admissions and delays to treatment. Patients with larger or more numerous recurrences are listed for cystodiathermy under general anaesthetic (GA) or transurethral resection of bladder tumour (TURBT) depending on the size.

The aim of this audit was to record prospectively recurrence rates following LA cystodiathermy for superficial bladder TCC. Patient tolerance and cost implications were also assessed.

Abbreviations: CD, cystodiathermy; GA, general anaesthetic; LA, local anaesthetic; TCC, transitional cell carcinoma; TURBT, transurethral resection of bladder tumour

Patients and Methods

Over a 10-month period, 264 review flexible cystoscopies were performed on patients with a past history of bladder or upper tract TCC, of which 91 (34%) were positive. At the time of diagnostic review flexible cystoscopy, the site, size and number of recurrences was noted. If suitable, the patient was offered cystodiathermy under LA during the same visit and the duration of treatment and patient tolerability was recorded. Recurrences in patients with a history of high-grade disease, tumours greater than 1 cm in diameter, multiple large recurrences or those recurrences in a location requiring significant deflection were excluded.

For those patients with recurrence at cystoscopy, the mean age was 74 years (range, 32–95 years). At initial diagnosis, 78% of these patients had Ta (confined to the urothelium) disease and 5% had had previous upper tract TCC. The majority had low-grade disease (69%); however, there were small numbers of patients with a past history of higher grade tumours (Table 1).

Patients were placed in the supine position. After sterile preparation, Instillagel® was instilled into the urethra of all patients before insertion of the cystoscope. Antibiotics were not routinely used and no parenteral sedation or analgesia was used. Suitable tumours were fulgurated with a size 4-Fr Wolf fine cystodiathermy electrode (Richard Wolf Medical Instruments Corporation, Wimbleton, UK) placed through the working port of the flexible cystoscope. The Eschmann TD300 solid state electrosurgical unit (Eschmann Brothers & Walsh, West Sussex, UK) was set for monopolar coagulation at 3.0. The diathermy plate (earthing electrode) was most commonly placed on the patients' right proximal thigh unless contra-indicated and glycine was used as the irrigating fluid.

Results

Of 91 recurrences, 49 (61%) patients had a solitary recurrence whilst nine (11%) had greater than five recorded recurrences. Fifty-one (64%) patients had recurrence considered suitable for cystodiathermy under LA. Twenty-five (31%) patients required in-patient treatment under GA, two (2.5%) patients had holmium:YAG laser tumour ablation to large recurrences due to poor fitness levels and two (2.5%) were referred for intravesical mitomycin treatment.

Of the group who received LA cystodiathermy, all 51 procedures were completed successfully. Forty-five (88%) patients tolerated the procedure very well whereas six (12%) completed treatment but found it painful. No patients declined treatment or were referred for GA due to problems with tolerability. Forty-seven (92%) of these treatments were completed within 5 min. None of the procedures lasted longer than 10 min.

Table 1 The characteristics for superficial bladder TCC recurrences identified at flexible cystoscopy in 80 patients

Variable	Value
Mean age (range), years	74 (32–95)
Sex	
Male	56
Female	24
Histology at presentation	
G1pTa/G2pTa	55
G2–3pTa	6
G2pT1	4
G3pT1	4
G3pT2	2
Upper tract TCC	4
CIS	3
Not known	2
Recurrences (n)	
1	49
2–5	22
> 5	9
Treatment	
LA cystodiathermy	51
LA holmium:YAG laser	2
GA cystodiathermy	16
GA TURBT	9
Intravesical mitomycin	2
Cystodiathermy tolerance	
Well tolerated	45
Tolerated but painful	6
Unable to tolerate	0
Median time to follow-up after CD (range), weeks	15 (10–42)
Outcome following cystodiathermy	
No recurrence	30
Recurrence at different site	15
Recurrence at same site	3
Not known	3

At a median follow-up of 15 weeks (range, 10–42 weeks), recurrence data were available for 48 of the 51 patients. Thirty (63%) patients had no recurrence visible, 15 (31%) had recurrence at a different site (80% subsequently treated with LA cystodiathermy and 20% referred for GA cystodiathermy) and three (6%) tumours recurred at the same site treated by cystodiathermy (2 were treated with LA cystodiathermy and 1 with GA cystodiathermy). Therefore, in this group, only four of 48 (8%) patients undergoing LA cystodiathermy required hospital admission and a GA procedure;

furthermore, none of these patients suffered from progression of their disease over the follow-up period.

Of those patients with recurrences considered unsuitable for LA cystodiathermy, nine patients subsequently underwent a transurethral resection of bladder tumour (TURBT) with a median hospital length of stay of 3 days (range, 0–7 days) and 16 patients required cystodiathermy under GA with a median stay of 2 days (range, 0–4 days). Only three (12.5%) of these patients were discharged on the same day as their procedure (1 following cystodiathermy and 2 following TURBT).

Discussion

This audit provides further evidence that LA cystodiathermy is safe, well tolerated and does not appear to have an adverse effect on disease recurrence, albeit with short-term follow-up. Only 6% of patients treated with LA cystodiathermy required further treatment for recurrence at the same site, which is lower than reported rates.^{10,12} Of treatments, 92% were completed within 5 min proving that cystodiathermy can feasibly be performed during the allocated 15-min appointment for a review flexible cystoscopy.

The advantages over GA cystodiathermy are numerous. Patients undergo one, instead of two, invasive procedures. No additional training is required for nursing staff with theatre experience. Patients tolerate the procedure well and have the re-assurance that any recurrence noted has been treated at the time of diagnosis preventing undue anxiety whilst awaiting admission for treatment. Unnecessary anaesthetics are avoided in a group of patients who are at high risk of requiring multiple procedures. Staff requirements are fewer: LA cystodiathermy requires two members of staff (one nurse plus doctor or specialist nurse to perform the procedure), whereas in theatre under GA, 4–5 members of staff are required (surgeon, anaesthetist, anaesthetic assistant, scrub nurse and/or runner). Finally, LA cystodiathermy prevents the unnecessary use of hospital beds and provides theatre space for alternative cases.

Laser fulguration has been suggested as a suitable alternative.^{9–11} However, there are no specific advantages when used in the same patient group. The same limitations are experienced in laser fulguration as in cystodiathermy: (i) neither are able to treat the majority of recurrences at the bladder neck due to the inability to deflect the flexible cystoscope without damaging the laser or diathermy probe; (ii) views are poor if the urine is turbid or blood-stained, although it is possible to perform bladder washout via the cystoscope in both cases; and (iii) neither method provides tissue for histological examination. It has been suggested that skilled urologists can identify non-invasive low-grade papillary bladder tumours on cystoscopy and, therefore, all recurrences do not require biopsy and histological confir-

mation.^{8,15} Conversely, patients have to be brought back to an allocated theatre list to receive laser treatment with experienced staff, the staff must be trained in laser safety and use prior to performing laser fulguration and there is the potential for serious damage to the flexible cystoscope if the laser probe is withdrawn into the cystoscope during treatment. Finally, many urology departments in the UK do not have access to the holmium:YAG laser and, therefore, laser fulguration would either be impossible or represent a significant cost to purchase and train staff in their use.

Jonler *et al.*⁹ used the holmium:YAG laser to treat a mean number of two (range, 1–8) recurrences with a mean size of 5 mm (range, 2–30 mm) in 52 patients. The recurrences were detected at review flexible cystoscopy and the patients returned for laser fulguration at a later date necessitating an additional visit. They estimated a cost saving of €1350 per in-patient procedure and €350 per day-case procedure prevented (equivalent to £1227 and £318 at an exchange rate of 1.1 €/£); however, the cost of the holmium:YAG laser, estimated at €125,000 (£113,636) and the additional visits were excluded from these calculations. In addition, these calculations were based on the assumption that these patients would otherwise undergo TURBT whereas these patients with small volume recurrences (mean, 5 mm) would normally be treated with cystodiathermy under general anaesthesia rather than TURBT. Taking this into account, their cost savings would actually be at least three times lower. In the UK, reimbursement costs for TURBT are £1494 as opposed to £446 for cystodiathermy under general anaesthesia (three times the cost).¹⁴

With the introduction of Payment by Results, LA cystodiathermy at the time of review flexible cystoscopy now generates the same revenue for the hospital as GA cystodiathermy (£446). This, in turn, provides additional theatre time and hospital beds for procedures which may generate more revenue for the hospital.

Conclusions

Cystodiathermy under LA is well tolerated, prevents in-patient episodes and appears to have no effect on disease recurrence. With the delay seen in time to admission for GA procedures, treatment at the time of diagnosis of recurrence is preferable to reduce patient anxiety. Holmium:YAG laser fulguration has been suggested to be a suitable alternative; however, cystodiathermy under LA is cheaper and equally as effective with similar limitations. We suggest that cystodiathermy under local anaesthesia should remain the treatment of choice for small superficial bladder transitional cell carcinoma recurrence.

References

1. Holmang S, Hedelin H, Anderstrom C, Johansson SL. The relationship among

- multiple recurrences, progression and prognosis of patients with stages Ta and T1 transitional cell cancer of the bladder followed for at least 20 years. *J Urol* 1995; **153**: 1823–6.
2. Leblanc B, Duclos AJ, Benard F, Côté J, Valiquette L, Paquin JM *et al*. Long-term follow up of initial Ta grade 1 transitional cell carcinoma of the bladder. *J Urol* 1999; **162**: 1946–50.
 3. Haukaas S, Daehlin L, Maartmann-Moe H, Ulvik NM. The long-term outcome in patients with superficial cell carcinoma of the bladder: a single institutional experience. *BJU Int* 1999; **83**: 957–63.
 4. Holmang S, Hedelin H, Anderstrom C, Holmberg E, Busch C, Johansson SL. Recurrence and progression in low grade papillary urothelial tumours. *J Urol* 1999; **162**: 702–7.
 5. Heney NM, Ahmed S, Flanagan MJ, Frable W, Corder MP, Hafermann MD *et al*. Superficial bladder cancer: progression and recurrence. *J Urol* 1983; **130**: 1083–6.
 6. Herr HW. Outpatient flexible cystoscopy and fulguration of recurrent superficial bladder tumours. *J Urol* 1990; **144**: 1365–6.
 7. German K, Hasan ST, Derry C. Cystodiathermy under local anaesthesia using the flexible cystoscope. *Br J Urol* 1992; **69**: 697–8.
 8. Donat SM, North A, Dalbagni G, Herr HW. Efficacy of office fulguration for recurrent low grade papillary bladder tumours less than 0.5 cm. *J Urol* 2004; **171**: 636–9.
 9. Jonler M, Lund I, Bisballe S. Holmium:YAG laser vaporisation of recurrent papillary tumours of the bladder under local anaesthesia. *BJU Int* 2004; **94**: 322–5.
 10. Syed HA, Biyani CS, Bryan N, Brough SJ, Powell CS. Holmium:YAG laser treatment of recurrent superficial bladder carcinoma: initial clinical experience. *J Endourol* 2001; **15**: 625–7.
 11. Sakkas G, Karagiannis A, Karayannis D, Dimopoulos K. Laser treatment in urology: our experience with neodymium: YAG and carbon dioxide lasers. *Int Urol Nephrol* 1995; **27**: 405–12.
 12. Wedderburn AW, Ratan P, Birch BR. A prospective trial of flexible cystodiathermy for recurrent transitional cell carcinoma of the bladder. *J Urol* 1999; **161**: 812–4.
 13. Herr HW. Does cystoscopy correlate with the histology of recurrent papillary tumours of the bladder? *BJU Int* 2001; **88**: 683–5.
 14. Department of Health. *National Tariff 2008/09*. 2007
<http://www.dh.gov.uk/en/Managingyourorganisation/Financeandplanning/NHSFinancialReforms/DH_081226>.