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EXCRETION OF COLORED URINE AFTER INTRAVENOUS INJECTION OF INDIGO CARMINE DYE

Hypothesis / aims of study

Cystoscopy is endoscopy of urinary bladder via urethra which allows pelvic surgeons to evaluate ureteral patency and the bladder mucosa for inadvertent damage [1]. The purpose of this study is to evaluate predictors of the time required to cystoscopically visualize excretion of colored urine after intravenous injection of 2.5 milliliters of 0.8% indigo carmine dye.

Study design, materials and methods

Consecutive females who undergo routine cystoscopy as part of a vaginal surgery for prolapse and/or incontinence were included in this prospective study. Demographic information, preoperative serum creatinine values, and operative fluid balance at the time of cystoscopy were gathered.

Results

Sixty-two consecutive patients were enrolled in the study and one patient was excluded from the analysis due to history of unilateral kidney resection (Table #1). Indigo carmine dye was visualized from the first ureteral orifice at a mean of 4:01 minutes (SD 1:35) and from the second ureteral orifice at 5:34 minutes (SD 1:20) following intravenous administration. Predictors of seeing the dye sooner included older patients ($p<0.05$) and an increased estimated blood loss ($p<0.01$) (Table #2). Factors that did not affect time to colored urine efflux included higher body mass index, and higher serum creatinine.

Table 1: Demographics of study participants

Demographic or intraoperative factors	N	Mean	SD
Age (years)	62	60	14
Body Mass Index (kg/m^2)	62	27.4	5.5
Pre-operative serum creatinine (µmol/L)	58	0.82	0.20
Amount of intravenous fluids given at time of cystoscopy (mL)	62	1560	779
Estimated blood loss at time of cystoscopy (mL)	62	120	144

The overall incidence of ureteral injury was 1.6%. No subjects required intervention to the lower urinary tract within the six week perioperative period.

Table 2:
Regression model predicting the time until dye is first seen effluxing from the ureteral orifice

Predictor	**β**	**P-value**
Age	-0.04	0.02*
Body mass index	0.07	0.06
Pre-operative serum creatinine	0.67	0.54
Amount of intravenous fluids given at time of cystoscopy (mL)	0.00	0.42
Estimated blood loss at time of cystoscopy (mL)	-0.01	0.01*
History of hypertension	-0.08	0.88

History of Diuretic use	0.74	0.22
(Constant)	5.35	0.01*

* Statistically significant at α = 0.05

Interpretation of results

If the gynecologic surgeon does not see efflux of dye from a ureteral orifice within 7:11 minutes (greater than 2 standard deviations from the mean time of dye efflux) then we recommend further intra-operative evaluation of ureteral patency.

Concluding message

Ureteral injury is a leading cause of medicolegal action by patients.[2] Cystoscopy detects ureteral injuries that would have otherwise been missed. We recommend waiting at least seven minutes from intravenous administration to cystoscopic visualization of indigo carmine dye.

References

1. Sakellariou P, Protopapas AG, Voulgaris Z, Kyritsis N, Rodolakis A, Vlachos G, et al. Management of ureteric injuries during gynecological operations: 10 years experience. Eur J Obstet Gynecol Reprod Biol 2002;101:179-84.
2. Gilmour DT, Baskett TF. Disability and litigation from urinary tract injuries at benign gynecologic surgery in Canada. Obstet Gynecol 2005;105:109-14.

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Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**