

TITLE: Epidural Fentanyl: A Simple and Novel Approach to Anesthetic Management For Extracorporeal Shockwave Lithotripsy (ESWL)

AUTHORS: Sujit K. Pandit, M.D. Robert B. Powell, CRNA, MN, Bruce Crider, M.D., Ian Douglas McLaren, M.D., Timothy Rutter, M.D.

AFFILIATION: University of Michigan Medical Center, Department of Anesthesiology, Ann Arbor, Michigan 48109

Introduction. The recent introduction of Extracorporeal Shockwave Lithotripsy (ESWL) to replace the operative removal of renal calculi has revolutionized the treatment of these patients. This non-invasive procedure has saved patients: a major operation, several days of hospitalization, loss of working days and enormous expense. However, the anesthetic management of this procedure is not simple. General anesthesia in the lithotripsy gantry and waterbath is cumbersome. Epidural anesthesia is less cumbersome and as effective as general anesthesia. Some of the disadvantages of epidural anesthesia include, delayed onset of action, significant sympathetic block and prolonged motor blockade. Hypotension, prolonged recovery room stay and postoperative urinary retention are not uncommon after high epidural blockade. Ideally, anesthesia for ESWL procedures should provide a calm patient, good analgesia of quick onset and short duration, no loss of consciousness, no sympathetic or motor blockade and a prompt recovery. It should also be simple to perform. We have found that epidural fentanyl in saline provides an ideal solution to this problem.

Method. The institutional Human Use Committee approved the study and the patients gave informed consent. The study was divided into two parts. In part one, we gave epidural fentanyl in saline to 75 consecutive patients in various doses to determine the optimal dose for safe and effective analgesia. About two thirds of the 75 cases were done as ambulatory procedures. The second part consisted of a double blind study of thirty patients where fentanyl in saline (10 patients) was compared with 1% Lidocaine with 1:200,000 epinephrine (10 patients) and 2% 2-chloroprocaine (10 patients) given epidurally.

Premedication consisted of Midazolam 1-2.5mg I.V. The epidural test dose used was 5% Lidocaine 60-75 mg and 100 ug of Epinephrine. In the first 75 patients (Part I), epidural Fentanyl 100-200 ug in 20 mls of preservative free normal saline was injected through an epidural catheter placed at the L2-3 interspace. Effectiveness of analgesia (independently judged by the anesthesiologist, the urologist, and the patient) was recorded as: excellent, good, fair, or poor. Intraoperative and postoperative vital signs, including respiratory rates, were recorded at regular intervals. Side-effects and treatment, if any, were also noted. The second part (30 patients) was conducted in the same fashion except that the three drugs being compared were injected in a random, double blind manner. The patients were contacted 2-3 days after the procedure to ask their opinion of their anesthesia care and to see if they had experienced any side effects.

Results. The effectiveness of epidural fentanyl in saline for ESWL procedure was considered to be

excellent or good in 97% of the cases by the anesthesiologist (Table 1) in part one. There were no incidents of immediate or delayed respiratory depression (rate less than 10pm), or hypotension (reduction of systolic blood pressure of more than 20%) either during or after the procedure. The onset of action was quick (5 minutes) and the duration of analgesia was adequate. Pruritis was common and was present in 35% of the patients during the procedure and in 49% of the patients in the recovery unit. Treatment with Naloxone was invariably successful and was employed in 30% of the pruritis cases. There was no incident of urinary retention, and only one case of nausea and vomiting. Some discomfort was noted during cystoscopy and stent placement, especially in male patients. Topical 2% Lidocaine gel per urethra and I.V. midazolam (and/or I.V. fentanyl) were used to reduce this discomfort. The results of this double blind comparison of Fentanyl in saline, 1% Lidocaine and 2-Chlorprocaine in Part 2 are shown in Table 2.

Discussion. Epidural Fentanyl in saline for ESWL procedures in Part 1 demonstrated that Epidural Fentanyl is highly effective, safe and simple to perform. The acceptance of this technique by the urologists, the recovery room nurses and the patients was unequivocally overwhelming. Since there is neither a sympathetic nor a motor blockade, this technique reduces both the patient's recovery room stay and the hospital expenses. The patients feel well enough to return to their normal activities soon after the procedure is over. The double blind comparison of Fentanyl with Lidocaine and 2-Chlorprocaine proved that Fentanyl in saline provides as good an analgesia for ESWL as do the local anesthetic agents, without their undesirable side-effects. Absence of urinary retention after Fentanyl is another important advantage of epidural Fentanyl. Pruritis is common but is readily treated with Naloxone.

Conclusion. We have found that Epidural Fentanyl is an efficacious, simple and safe alternative to both general and traditional epidural anesthesia for ESWL procedure.

TABLE 1
EFFECTIVENESS OF EPIDURAL FENTANYL IN SALINE (N=75)

	Excellent	Good	Fair	Poor
Anesthesiologist	77	20	0	3
Urologist	84	12	1	3
Patients	83	14	0	3

TABLE 2
RESULTS OF DOUBLE BLIND COMPARISON (30 Patients)

Excellent/Good Analg	2-Chlor(10)	Fentanyl(10)	Lido(10)
	90%	100%	90%
Intraoperative			
Bradycardia	0	1	1
Hypotension	3	0	1
Pruritis	0	1	0
Tachycardia	1	0	0
Postoperative			
Headache	0	0	1
Nausea	0	0	1
Pain	4	0	1
Pruritis	1	6	0
Urine Retention	0	0	1