

# A PROSPECTIVE STUDY ON USE OF FENTANYL IN SPINAL ANAESTHESIA FOR LAPAROSCOPIC HYSTERECTOMY

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## **Abstract**

**Introduction:** Laparoscopic surgeries hysterectomy is routinely performed laparoscopically. It has many advantages as compared to open abdominal hysterectomy such as less post operative pain, better cosmetic results, shorter hospital stay, lower complication rate. However Laparoscopic surgeries are routinely performed under general anaesthesia with endotracheal intubation to prevent aspirations of gastric contents and respiratory embarrassment secondary to pneumoperitoneum. But it has several disadvantages like hemodynamic instability, postoperative nausea and vomiting, increased postoperative analgesic requirement, complications related to intubation or extubation and postoperative sore throat.

**Material and Methods:** After the approval of institutional ethics committee and written informed consent 24 ASA grade 1 and 2 patients in the age group of 35 to 55 years underwent total laparoscopic hysterectomy under spinal anaesthesia with intrathecal bupivacaine and fentanyl. Exclusion criteria included those with presence of any condition contraindicating elective surgery or spinal anaesthesia. The patients were explained during pre-operative visit about the procedure and also told that any anxiety, pain, or discomfort during the surgery would be dealt with intravenous medications or if required conversion to general anaesthesia.

**Results:** In our study 24 patients were taken for total laparoscopic hysterectomy during the period. Age group of patients between 40 to 60 years. All the 24 surgeries were completed laparoscopically. Average duration for surgery is 90 min (60-120min). None of the patient required conversion to general anaesthesia. Intraoperative parameters including blood pressure, pulse rate, spo2 and respiratory rate were all within normal limits. 8 patients required pharmacological intervention for hypotension with one time support of inj mephentermine 6mg. 6 patients required inj. glycopyrolate 0.2mg for bradycardia (HR less than 50). Patients were catheterised preoperatively. There was no case of PDPH. All the patients received inj pentazocine 30mg in divided doses for shoulder tip pain. None of the patient developed respiratory depression or required assistance for ventilation.

**Conclusion:** Our study has confirmed the feasibility of performing these surgeries under spinal anaesthesia as a sole anaesthetic technique. It also provides minimal hemodynamic perturbations, postoperative pain control and patient satisfaction. However this approach requires cooperative patient, experienced surgeon and anaesthetist who is ready to supplement it with intravenous medication if required. Thus we can conclude that if properly applied regional anaesthesia has scope to become gold standard anaesthetic technique for laproscopic procedures in future.

**Keywords:** Fentanyl, Spinal Anaesthesia, Laparoscopic Hysterectomy

### **Introduction**

With the development of Laparoscopic surgeries hysterectomy is routinely performed laparoscopically. It has many advantages as compared to open abdominal hysterectomy such as less post operative pain, better cosmetic results, shorter hospital stay, lower complication rate. <sup>[1]</sup> However Laparoscopic surgeries are routinely performed under general anaesthesia with endotracheal intubation to prevent aspirations of gastric contents and respiratory embarrassment secondary to pneumoperitoneum. <sup>[2]</sup> But it has several disadvantages like hemodynamic instability, postoperative nausea and vomiting, increased postoperative analgesic requirement, complications related to intubation or extubation and postoperative sore throat. <sup>[3]</sup>

Although there are many reports of laparoscopic cholecystectomy and laparoscopic inguinal hernia repair under regional anaesthesia have been published few studies have involved laparoscopic hysterectomy under regional anaesthesia. <sup>[4]</sup> Use of regional anaesthesia in laparoscopic surgery has been limited to patients at high risk for general anaesthesia due to severe coexisting pulmonary, cardiac or ither disease. <sup>[5]</sup> Regional anaesthesia has been successfully used for laparoscopic surgeries unfit for general anaesthesia but not tried in fit patients. <sup>[6]</sup>

Laparoscopic surgeries under regional anaesthesia in previous studies is commonly associated with problems such as referred shoulder tip pain secondary to co2 pneumoperitoneum, patient

anxiety, pain, discomfort and inadequate sedation which can be easily managed by intravenous analgesics.<sup>[7]</sup> Herewith we present case series of 24 patients undergoing total laparoscopic hysterectomy under spinal anaesthesia with intrathecal bupivacaine and fentanyl.<sup>[8]</sup>

### **Material and Methods**

After the approval of institutional ethics committee and written informed consent 24 ASA grade 1 and 2 patients in the age group of 35 to 55 years underwent total laparoscopic hysterectomy under spinal anaesthesia with intrathecal bupivacaine and fentanyl. Exclusion criteria included those with presence of any condition contraindicating elective surgery or spinal anaesthesia.

The patients were explained during pre-operative visit about the procedure and also told that any anxiety, pain, or discomfort during the surgery would be dealt with intravenous medications or if required conversion to general anaesthesia.

During and after the procedure patients were encouraged to report any side effects like shoulder tip pain, discomfort, nausea or vomiting.

All patients were advised overnight fasting and received 0.5 mg Alprazolam in the night prior to surgery. In the operative room iv line secured and inj. Ondansetron 8 mg and Inj Ceftioxone 1gm given intravenously. All patients received 15ml/kg RL preloading. All routine monitors ECG, NIBP, Spo2 were attached and baseline vital signs were recorded.

The patients were positioned in sitting position and L2-L3 or L3-L4 space was palpated. Under strict aseptic precautions spinal anaesthesia was given with 26G quincke's needle and after confirmation of free flow of csf inj. Bupivacaine 0.5% (heavy) and fentanyl 25 mcg given intrathecally. Patients were turned to supine position and 10 degree trendelenberg tilt was given to achieve required level of block as assessed by pin prick method.

HR, ECG, Spo2 monitors attached and NIBP recorded every 3 minutes for duration of surgery. Once the block was considered adequate (minimum block T4 as assessed by pin prick method) surgery was commenced using co2 insufflation at maximum pressure limit of 12 mmHg.

Anxiety if required was treated with iv midazolam 2mg in divided doses. Shoulder tip pain or any discomfort due to co2 pneumoperitoneum was treated with inj. pentazocine 30 mg in divided doses. Hypotension was treated with fluid bolus or inj. mephentermine 6mg bolus and 3mg was repeated as and when required. Bradycardia (HR < 50) was treated with inj. glycopyrolate 0.2 mg iv bolus and if required inj. Atropine 0.6 mg iv.

The surgical procedure of total laparoscopic hysterectomy was carried out according to standard protocol with no modification. Operative time as well as any intraoperative event was recorded.

All the patients were given 100 mg of inj. Tramadol for postoperative pain relief. Inj. Diclofenacsodium 75 mg im sos given in the postoperative period.

**Results**

In our study 29 patients were taken for total laparoscopic hysterectomy during the period. Age group of patients between 40 to 60 years. All the 29 surgeries were completed laparoscopically. Average duration for surgery is 90 min (60-120min). None of the patient required conversion to general anaesthesia.

Intraoperative parameters including blood pressure, pulse rate, spo2 and respiratory rate were all within normal limits. 8 patients required pharmacological intervention for hypotension with one time support of inj mephentermine 6mg. 6 patients required inj. glycopyrolate 0.2mg for bradycardia (HR less than 50). Patients were catheterised preoperatively. There was no case of PDPH. All the patients received inj pentazocine 30mg in divided doses for shoulder tip pain. None of the patient developed respiratory depression or required assistance for ventilation.

**Table 1. Demography and surgical profile.**

Parameter	(n=29)
Age (years)	45.86 (6.83)
Weight (kg)	61.10 (7.72)
Height (cm)	159.21 (6.7)
Surgical indication†: Uterine myoma / AUB	23 / 6
Duration of surgery (min)	82.83 (29.57)
Intra-operative fluid (ml)	1481.03 (249.43)
Surgical blood loss (ml)	235.52 (133.80)
Intra-operative urineoutput (ml)	102.84 (26.80)

**Table 2. Intra-operative events and medications**

Parameter	(n=29)
Visceral pain	14 (48.3)
Hypotension	6 (20.7)
Bradycardia	1 (3.4)
Shivering	11 (37.9)
Pruritus	12 (41.4)
Midazolam need	13 (44.8)
Anti-emetics need	11 (37.9)
Fentanyl need	9 (31.0)

**Table 3. Severity of visceral pain.**

Visceral pain grade *	(n=29)
1=No complaints	15 (51.7)
2=Mild discomfort	2 (6.9)
3=Intermediatediscomfort	3 (10.3)
4=Severe discomfort	9 (31.0)
5=Requirement for GA	Nil

**Table 4. Duration of analgesia and postoperative events.**

Parameter	(n=29)
Duration of analgesia *	192.52(28.05)
Total analgesicdoses*	5.97 (1.76)
Nausea†	8 (27.6)

**Discussion**

Nowadays laparoscopic surgery is becoming gold standard. Previously regional anaesthesia was not considered suitable for the laparoscopic procedures because of the risk of aspiration, discomfort due to co<sub>2</sub> pneumoperitoneum, increased load of co<sub>2</sub>, and shoulder tip pain. General anaesthesia as the only suitable technique for laparoscopic procedures is the concept of past asit doesn't facilitate postoperative analgesia and emesis free recovery. Also, there are various complications associated with airway instrumentation and risk of unanticipated difficult airway. In addition, sympathetic stimulation due to stress response during intubation in GA adds to sympathetic overactivity due to pneumoperitoneum resulting in hypertensive episodes. So in terms of safety and post of morbidity and pain scores regional anaesthesia is a better choice for laparoscopic procedures.<sup>[9-12]</sup>

This case series provides a indication regarding safety and adequacy of spinal anaesthesia with bupivacaine and fentanyl in patients undergoing total laproscopic hysterectomy. The combination of bupivacaine heavy 0.5% with fentanyl 25mcg in spinal anaesthesia with 10 degree trendelenberg tilt provides adequate level of sensory blockade and abdominal relaxation in all our 24 patients undergoing total laproscopic hysterectomy.<sup>[13]</sup>

None of the patient developed respiratory depression or breathing difficulty as respiratory mechanism remains intact and diaphragm the main respiratory muscle is unaffected allowing the patient to adjust minute ventilation by increasing the respiratory rate. Cardiovascular changes were also minimal. Hypotension and bradycardia are minimal and it can easily be managed with bolus iv fluids and pharmacological intervention. 8 patients required one time support of 6mg of inj. mephentermine. 6 patients required inj. glycopyrolate for bradycardia (HR<50/min).<sup>[14-17]</sup>

Shoulder tip pain is quite common during laproscopic procedure under regional anaesthesia dueto stretching of diaphragm by co<sub>2</sub> insufflation as diaphragm is supplied by cervical roots which are spared during regional anaesthesia. In our study all patients received inj. pentazocine 30mg in divided doses once the pneumoperitoneum is induced and maximum pressure limit set up to 12mmHg. Any anxiety due to awareness is treated with inj. midazolam 2mg iv. Use of fentanyl intrathecally has a sedative effect which is an added advantage in these patients.<sup>[18-21]</sup>

Another advantage of regional anaesthesia was reduced incidence of intraop and postopnausea and vomiting (PONV). Adequate hydration, reduced systemic opioid use and pre op prophylaxis by odensetron resulted in reduced incidence. PONV is particularly troublesome after GA due to use of opioids, N<sub>2</sub>O and reversal agents.<sup>[22]</sup>

Studies have suggested that intrathecal fentanyl prolongs sensory and motor block from spinal anaesthesia and decreases anaesthetic requirement during surgery and increases postoperative

analgesia. So there was no restlessness, sore throat, dizziness, relaxant induced muscle pain as commonly seen with GA. Prolonged post operative analgesia resulted in smooth and uneventful recovery of patient.<sup>[23-28]</sup>

This study confirms feasibility of spinal anaesthesia as a sole technique in total laparoscopic hysterectomy. This study does not include cost analysis but other studies indicate laparoscopic surgeries under regional anaesthesia are more cost effective than under general Anaesthesia. This makes spinal anaesthesia with additives like fentanyl as an attractive option for total laparoscopic hysterectomy.

### **Conclusion**

Total laparoscopic hysterectomy has significantly reduced postoperative morbidity and mortality of patients. General anaesthesia as a sole anaesthetic technique for these procedure has negated some of the advantages of these procedures. Regional anaesthesia is much more safer and advantageous to the patients. We did this study to assess feasibility of doing total laparoscopic hysterectomy under spinal anaesthesia with additive like fentanyl without modification of surgical technique. Our study has confirmed the feasibility of performing these surgeries under spinal anaesthesia as a sole anaesthetic technique. It also provides minimal hemodynamic perturbations, postoperative pain control and patient satisfaction. However this approach requires cooperative patient, experienced surgeon and anaesthetist who is ready to supplement it with intravenous medication if required. Thus we can conclude that if properly applied regional anaesthesia has scope to become gold standard anaesthetic technique for laparoscopic procedures in future.

### **References**

1. Col R.K.Singh, Lt.Col A.M. Saini, Lt College Nitin Hoel, College Dinesh Vishay, College Atul Seth et al- Major laparoscopic surgery under regional anaesthesia: A prospective feasibility study *Med J Armed Forces*(2015) 126-131.
2. Rajesh S Mane, Mhanunach C Patil, K.S. Kedar eshwar, C. S Aani kop et al-Combine spinalepidural anaesthesia for laparoscopic appendicectomy in adults: A case series *Saudi J Anaesthesia* 2012;6:27-30.
3. Vretzakis G, Bare ka M, Aretha D, Karnikolas M. Regional anaesthesia for laparoscopic surgery: a narrative review. *J Anaest* 2014;28(3):429-446.
4. Chui PT, Gin T, oh TE. Anaesthesia for laparoscopic general surgery. *Anaesth Intensive care*.1993;21:163-171.
5. Gerges FJ, Manasi GE, Jabbour- Khoury SI. Anaesthesia for laparoscopic: A review. *J Club. Anaesth*.2006;18:67-78.
6. Eberhart LH, Hogel J, Seeling W, Staack AM, Geldner G, Georgieff M. Evaluation of three risk scores to predict postoperative nausea and vomiting. *Acta Anaesthesiol Scand*.

- 2000;44(4):480-8. [[PubMed](#) | [DOI](#)]
7. Kain ZN, Sevarino F, Alexander GM, Pincus S, Mayes LC. Preoperative anxiety and postoperative pain in women undergoing hysterectomy. A repeated-measures design. *J Psychosom Res.* 2000 Dec;49(6):417-22. [[PubMed](#) | [Full Text](#)]
  8. Pedersen H, Santos AC, Steinberg ES, Schapiro HM, Harmon TW, Finster M. Incidence of visceral pain during cesarean section: the effect of varying doses of spinal bupivacaine. *Anesth Analg.* 1989 Jul;69(1):46-9. [[PubMed](#)]
  9. Alahuhta S, Kangas-Saarela T, Hollmen AI, Edstrom HH. Visceral pain during caesarean section under spinal and epidural anesthesia with bupivacaine. *Acta Anaesthesiol Scand.* 1990 Feb;34(2):95-8. [[PubMed](#) | [DOI](#)]
  10. Hunt CO, Naulty JS, Bader AM, Hauch MA, Vartikar JV, Datta S, et al. Perioperative analgesia with subarachnoid fentanyl-bupivacaine for cesarean delivery. *Anesthesiology.* 1989 Oct;71(4):535-40. [[PubMed](#)]
  11. Seewal R, Shende D, Kashyap L, Mohan V. Effect of addition of various doses of fentanyl intrathecally to 0.5% hyperbaric bupivacaine on perioperative analgesia and subarachnoid-block characteristics in lower abdominal surgery: a dose response study. *Reg Anesth Pain Med.* 2007 Jan-Feb;32(1):20-6. [[PubMed](#) | [Full Text](#)]
  12. Kanazi GE, Aouad MT, Jabbour-Khoury SI, Al Jazzar MD, Alameddine MM, Al-Yaman R, et al. Effect of low-dose dexmedetomidine or clonidine on the characteristics of bupivacaine spinal block. *Acta Anaesthesiol Scand.* 2006 Feb;50(2):222-7. [[PubMed](#) | [DOI](#)]
  13. Al-Mustafa MM, Abu-Halaweh SA, Aloweidi AS, Murshidi MM, Ammari BA, Awwad ZM, et al. Effect of dexmedetomidine added to spinal bupivacaine for urological procedures. *Saudi Med J.* 2009 Mar;30(3):365-70. [[PubMed](#)]
  14. Bromage PR. A comparison of the hydrochloride and carbon dioxide salts of lidocaine and prilocaine in epidural analgesia. *Acta Anaesthesiol Scand (Suppl).* 1965;16:55-69. [[PubMed](#) | [DOI](#)]
  15. Hirabayashi Y, Saitoh K, Fukuda H, Shimizu R. Visceral pain during caesarean section: effect of varying dose of spinal amethocaine. *Br J Anaesth.* 1995 Sep;75(3):266-8. [[PubMed](#)]
  16. Ramsay MA, Savege TM, Simpson BR, Goodwin R. Controlled sedation with alphaxalone-alphadolone. *Br Med J.* 1974 Jun 22;2(5920):656-9. [[PubMed](#)]
  17. Eisenach JC, Shafer SL, Bucklin BA, Jackson C, Kallio A. Pharmacokinetics and pharmacodynamics of intraspinal dexmedetomidine in sheep. *Anesthesiology.* 1994 Jun;80(6):1349-59. [[PubMed](#) | [Full Text](#)]
  18. Harada Y, Nishioka K, Kitahata LM, Kishikawa K, Collins JG. Visceral antinociceptive effects of spinal clonidine combined with morphine, [D-Pen2, D-Pen5] enkephalin, or U50,488H. *Anesthesiology.* 1995 Aug;83(2):344-52. [[PubMed](#)]



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19. Danzebrink RM, Gebhart GF. Antinociceptive effects of intrathecal adrenoceptor agonists in a rat model of visceral nociception. *J Pharmacol Exp Ther.* 1990 May;253(2):698-705. [[PubMed](#) | [Full Text](#)]
20. Eid HEA, Shafie MA, Youssef H. Dose-related prolongation of hyperbaric bupivacaine spinal anesthesia by Dexmedetomidine. *Ain Shams J Anesthesiol.* 2011;4(2):83-95. [[Full Text](#)]
21. Hamber EA, Visconi CM. Intrathecal lipophilic opioids as adjuncts to surgical spinal anesthesia. *Reg Anesth Pain Med.* 1999 May-Jun;24(3):255-63. [[PubMed](#)]
22. Gupta R, Verma R, Bogra J, Kohli M, Raman R, Kushwaha JK. A comparative study of intrathecal dexmedetomidine and fentanyl as adjuvants to bupivacaine. *J Anaesthesiol Clin Pharmacol.* 2011 Jul;27(3):339-43. [[PubMed](#) | [DOI](#)]
23. Al-Ghanem SM, Massad IM, Al-Mustafa MM, Al-Zaben KR, Qudaisat IY, Qatawneh AM, et al. Effect of adding dexmedetomidine versus fentanyl to intrathecal bupivacaine on spinal block characteristics in gynecological procedures: A double blind controlled study. *Am J Appl Sci.* 2009;6(5):882-7. [[DOI](#)]
24. Mohamed AA, Fares KM, Mohamed SA. Efficacy of intrathecally administered dexmedetomidine versus dexmedetomidine with fentanyl in patients undergoing major abdominal cancer surgery. *Pain Physician.* 2012 Jul-Aug;15(4):339-48. [[PubMed](#)]
25. Niu XY, Ding XB, Guo T, Chen MH, Fu SK, Li Q. Effects of intravenous and intrathecal dexmedetomidine in spinal anesthesia: a meta-analysis. *CNS Neurosci Ther.* 2013 Nov;19(11):897-904. [[PubMed](#) | [DOI](#)]
26. Usta B, Gozdemir M, Demircioglu RI, Muslu B, Sert H, Yaldiz A. *Dexmedetomidine for the prevention of shivering during spinal anesthesia. Clinics (Sao Paulo).* 2011;66(7):1187-91.
  27. Arati S, Ashutosh N. Comparative analysis of spinal vs general anaesthesia for laproscopic cholecystectomy: a prospective randomized study. *Internet J Anaesthesia.* 2009;24(1).
  28. Agrawal N, Gupta A, Gupta K, Khare S. Feasibility of laproscopic cholecystectomy under spinal anaesthesia. *People's J Sci Res.* 2012;5(2):17-21.
  - 29.