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EPIDURAL ROPIVACAINE & ROPIVACAINE WITH FENTANYL FOR POST OPERATIVE ANALGESIA AFTER MAJOR ABDOMINAL SURGERY

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Abstract
Objective:*Toobserveandevaluatetheanalgesiceffectiveness, hemodynamicresponse, quality of analgesia, sideeffectsandcomplicationsofepiduralropivacaine (0.2%) alone with combination of ropivacaine (0.2%) withfentanylforupto72h(threedays)afterabdominalsurgery.*
Methods*Prospective Observational study, Allthepatientsfulfillingtheinclusioncriteriawereselectedusingpurposive sampling.The participants were allocated into two groupsrandomly. Patients in group A received Ropivacaine 0.2% whereas that ingroupBweregivenRopivacaine0.2%withfentanyl25microgram. Postoperativelyhemodynamicparameters,VASscore,motorblockade, sedationscoreandoccurrenceofanysideeffectswerecalculatedevery15mintillfirst2hourspostoperativelyandthen2h ourlytill12handthenat24hrs ,72 hrs.*
Results*Participantsofboththegroupswerecomparablein all aspects.Mean onset of sensory blockade in group B wassignificantlylowerascomparedtoropivacainealone(p<0.001).Mean onset of motor blockade in group A was 35.35±2.97 minuteswhereas that of group B was 34.23±2.61 minutes and the differencewasstatisticallyinsignificant(p>0.05).Meandurationof analgesiawassignificantlylongeringroupB(R+F).Also mean duration of rescue top up was significantly longer forgroup B as compared to group A (p<0.01). Participants of group Arequiredsignificantlyhighernumberofrescuetopup(3.65±0.70)ascomparedtogroupB(1.43±0.59)(p<0.01).Hemo dynamicparameterswerestableandcomparableinparticipantsofboththegroupsthroughouttheobservationperiod(p>0. 05).Mean VAS and VNS was significantly higher in group A patients ascompared to group B during 4 to 12 hours postoperative duration(0<0.05).The occurrence of pruritis was significantly higher in patients ofgroupBascomparedtogroupA(p<0.01).*
Conclusion*Pain relief was significantly better in the ropivacaine/fentanyl group after the first hour and this difference lasted for the remaining time. There was no significant difference in adverse events between the two groups during 24 hours of assessment. In conclusion, the quality of analgesia was significantly improved by the addition of fentanyl to ropivacaine.*
Keywords*:Ropivacaine,Fentanyl ,Visual Analouge Scale(VAS),*

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I. Introduction

Postoperativepainmanagementisoneofthemostchallengingdomainof anesthesia. Post-operative pain is associated with neuroendocrinestresswhichisresponsibleforproteincatabolism,hyperglycemia,poor woundhealing,decreasedrespiratoryfunctionandincreasein myocardialoxygendemand.Post-operativepainmanagementmethodsmustbeeffective,safeandfeasible.Despitevariousadvancementin knowledge regarding pathophysiology of pain, and development ofeffectivepostoperativepaincontroltechniques,manypatientsstill continuetoreportandexperienceconsiderablediscomfortduetopain.[1,2]

Epiduralanalgesiaisthemosteffectiveandpopularregionalanesthesiatechnique used for providing pain relief not only perioperatively but alsopostoperativelymajorabdominalsurgeriesworldwide.Epiduralinfusionsareusuallycomposedofalocalanesthetic,an opioid,ora combinationofthetwo,soastoreducetherespectivedosesaswellastheincidenceofadverseeffects.Theadvantagesofepi duralanaesthesiaincludeeffectivesurgicalanaesthesia,abilitytomeetthe extendeddurationofsurgicalneeds,prolongedpost-operativeanalgesia, lowerincidenceofhemodynamicinstabilityanddecreasestherequirementofopioidanalgesics.Apartfromtheseadvanta ges, epidural analgesia positively contributes to recovery by facilitatingmobilizationandrecoveryofgutfunction.[3,4]

Mostcommonlyusedanalgesicwhichisusedinepiduralspaceis Bupivacainewhichwasconsideredastheideallocalanae sthetic,is known to be associated with various side effects. It has been found tobeassociatedwithcardiactoxicityandmyocardialarrest.Thus, ropivacaine,anenantiomerofbupivacainewasintroducedwhichas similar pharmacological profile as that of Bupivacaine but with muchbettersafetymargin.[5-8]

Ropivacaine is long-acting local anesthetic of amide group having afavorable analgesic effect with minimal side effects as compared tootherlongactinglocalanestheticsofsamegroupsuchasbupivacaine.Ropivacaine is available as 0.2% solution for epidural anesthesia and isconsidered as a less toxic analog of bupivacaine as it is associated withreducedincidenceandfrequencyofarrhythmias,andisless neurotoxic.However,itprovidesalessintensemotorblock witha slightlyshorterdurationofactionrequiringfrequentadministrationascomparedtobupivacaine. Since,localanesthetic usedaloneepidurallyisassociatedwith significant failure rates in providing routine analgesia resulting fromregression of the sensory block and the unacceptable incidence ofmotorblockadeandhypotension,varietyofadjuvantareusuallyadded toepiduralinfusionstoenhanceanalgesiawhileminimizingthesideeffects.Onesuchadjuvantincludefentanyl.[9-13]

Fentanyl, a lipid soluble opioid, has traditionally been used as an adjunctwithotheranalgesicstoachievethedesiredanestheticeffectatlowerdose with minimal side effects.Addition of opioid with epiduralanalgesia does provide a dose sparing effect of local anaesthetic andbetteranalgesiabutpossibilityofpruritis,urinaryretention,nausea, vomitingandrespiratorydepressionarehigh. A low dose of fentanyl is known to markedly improve the analgesicefficacyofbupivacainewheninfusedepidurallyaftermajorabdominalsurger.However,littleisknownaboutthe effectoflow doseof ropivacainein combination with fentanyl for epidural postoperativeanalgesia after major abdominal surgery. Thus the present study wasdesignedasanobservationalstudytoassesstheeffectiveness,quality aswellassafetyofanepiduralropivacaine(2mg/mL),aloneoradmixed withfentanylinconcentrationsof10-25microgramforpainmanagementover72hoursaftermajorabdominalsurgery.**[**14-16]

II. Materials And Methods

The present study entitled "Observational study of Epidural RopivacaineAlone and Ropivacaine with Fentanyl for Postoperative Analgesia afterMajorAbdominalSurgery"wasconductedinDepartmentofAnaesthesiology,L.N.MedicalCollegeandResearch Centreandassociated J.K Hospital,Bhopal.

StudyDesign: ThisstudywasconductedasProspectiveObservationalstudy.

StudyArea—L.N.MedicalCollegeAndResearchCentre&J.K.Hospital,Bhopal

StudyPopulation:Allthepatientsbelongingtoagegroupof28to65yearsundergoingmajorabdominalsurgeries.

StudyPeriod:2yearsi.e.from1st July2018to30th June2020.

Samplesize-Samplesizewascalculatedusingformula**n=N*X/(X+N–1),**where,X=Zα/22-*p*(1-p)/MOE^2,***Zα*/2**isthecriticalvalueoftheNormaldistributionatα/2(e.g.fora confidencelevelof95%,αis0.05andthecriticalvalueis1.96),

MOEisthemarginoferror=5%**p**isthesampleproportion-whichisestimatedtobe50%**N** is the population size which was estimated to be 100Thusthesamplesizewasestimatedtobe80.Participantswerethenallocatedinto2groupsof40patientseach.

Inclusioncriteria: Allthepatientsundergoing

- Majorabdominalsurgery
- Agedbetween28-65years
- ASAstatus2and3
- Weighing50-110kg
- Givingconsentforthestudy

Exclusioncriteria:

- Cardiacpatients

- Pregnancy
- Extremesofage>65years
- Age<18years.
- Patientrefusal

Sampling: Allthepatientsfulfillingtheinclusioncriteriawereselectedusingpurposive sampling.The participants were allocated into two groupsrandomly. Patients in group A received Ropivacaine 0.2% whereas that ingroupBweregivenRopivacaine0.2%withfentanyl25microgram.

Studytool

- Pretestedquestionnaire
- VAS
- VNS

CONSENT: Written consent was obtained from the parents/guardians of allthe neonates after explaining them the nature and purpose of the study.They were assured that confidentiality would be strictly maintained. Theoptiontowithdrawfromthestudywasalwaysopen.

METHODOLOGYAfterobtainingethicalclearancefromInstitute'sethicalCommittee,allthe patients80fulfillingtheinclusioncriteriaandgivingconsentforthestudywere selected using purposive sampling. Patients were then allocatedrandomlyinto2groups.

GroupA-receivedRopivacaine0.2%alone

GroupB-receivedRopivacaine0.2%withfentanyl25microgram.

Details regarding sociodemographic profile was obtained from all theparticipants.FollowingwhichtheyweresubjectedtodetailedphysicalandgeneralexaminationTheir height and weight was recorded. Also atbaseline,heartrate,bloodpressure,respiratoryrateandoxygensaturation were obtained and entered in questionnaire.

ProcedurePatientwereplannedinsittingpositionandunderasepticprecautions;a 18G epidural needle was inserted through the median approach at asuitable space between T12 — L1 depending on the level of surgicalincision.Epiduralspacewasidentifiedby"lossofresistance"technique and a disposable epidural catheter was inserted cephaloid 2-3cm into theepidural space and secured with an adhesive. Its position was confirmedby a test dose of 2ml lignocaine 2% with adrenaline and a possibility ofsubarachnoid intravascular injection was excluded. After a negative testdose,patientwasplacedinthesupinepositionandgeneral anaesthesiawas induced and case conducted .

In the postoperative ward a bolus of either 10 ml of Ropivacaine of 0.2%concentrationorfentanyl25mcgwith9.5mlofRopivacaineof0.2%concentrationwasgiventhroughtheepiduralcatheter6hourly.Analgesiawith epidural catheter were provided for three days. During this interval, ifanypatientcomplainedofmildpain(VASscore2-3), rescuetop-ups' wereprovidedwithintravenousTramadol50mg/mlandnumberofrescue"topups"doseswerenoted.

Postoperativelyhemodynamicparameters,VASscore,motorblockade, sedationscoreandoccurrenceofanysideeffectswerecalculatedevery15mintillfirst2hourspostoperativelyandthen2hourlytill12handthenat24hrs.PainintensitywasassessedusingVisualAnalogueScale(VAS),where patientsspecifytheintensityofpainbyindicatingapointalongacontinuous horizontal line, with numbers from 0 to 10 on the other side.Painintensityshouldnotexceed VAS3,asVAS4needstobetreated.The duration of analgesia was defined as the time from caudal placement ofdrugtothefirstrecordingofaVASscale≥4.Painassessmentwasalsoperformed with respect to the movement of the patient –VAS score oftenincreaseswithmovement,dependingontherangeofmotion.Thus,Visual AnalogScaleforanxietyisaline10cminlengthwith"notatallanxious" and"veryanxious"attheleftandrightextremesrespectively,werenoted andassessed.Quality of analgesia wasassessed through the VNS scoring. Hemodynamicmonitoringwasdone.

III. Observation Chart

Table1-COMPARISONOFONSETOFSENSORYBLOCKADE

Parameters	GroupA		GroupB		Pvalue
	Mean	SD	Mean	SD	
Onsetof sensoryblockade(min)	18.08	2.04	13.68	2.44	0.001

Table2-COMPARISONOFONSETOFMOTORBLOCKADE

Parameters	GroupA		GroupB		Pvalue
	Mean	SD	Mean	SD	
OnsetofMotorblockade(min)	35.35	2.97	34.23	2.61	0.105

Table3-COMPARISONOFDURATIONOFANALGESIA

Parameters	GroupA		GroupB		Pvalue
	Mean	SD	Mean	SD	
Duration	165.48	10.19	178.53	8.36	0.04

TABLE4-COMPARISONOFNUMBEROFRESCUETOPUP

Parameters	GroupA		GroupB		Pvalue
	Mean	SD	Mean	SD	
NumberOfRescueTopUp	3.65	0.70	1.43	0.59	0.001

TABLE5-COMPARISONOFMEANARTERIALPRESSUREATVARIOUSTIMEINTERVALSBETWEENTHEGROUPS

MAP	GroupA		GroupB		Pvalue
	Mean	SD	Mean	SD	
Basal	89.98	11.21	90.93	9.31	0.68
15minute	89.23	10.35	89.98	9.18	0.73
30minute	87.13	10.12	90.23	9.67	0.16
45minute	86.63	9.79	89.48	8.97	0.18
60minute	87.38	9.36	89.48	8.97	0.31
75minute	87.39	9.36	89.23	9.28	0.37
90minute	87.44	9.33	89.25	9.25	0.38
105minute	86.96	9.46	89.48	8.97	0.22
2hours	87.63	9.33	89.49	8.96	0.37
4hours	87.68	9.36	89.48	8.94	0.38
6hours	87.73	9.33	89.43	8.97	0.395
8hours	87.63	9.33	89.44	8.98	0.37
12hours	87.33	9.34	89.58	8.92	0.27
24hours	86.38	8.79	87.28	9.53	0.66
48hours	86.18	8.71	87.53	9.55	0.51
72hours	83.35	10.84	86.70	10.44	0.16

TABLE 6 COMPARISONOFVASATVARIOUSTIMEINTERVALSBETWEENTHEGROUPS

VAS	GroupA		GroupB		Pvalue
	Mean	SD	Mean	SD	
2hours	1.10	3.45	0.40	0.74	0.22
4hours	2.15	0.36	1.70	0.46	0.001
6hours	3.38	0.49	2.23	0.48	0.001
8hours	3.38	0.51	2.15	0.66	0.001
10hours	3.50	0.51	2.60	0.59	0.001
12hours	1.73	0.45	1.48	0.52	0.02
24hours	1.48	0.51	1.38	0.49	0.37
48hours	1.55	0.55	1.53	0.55	0.84
72hours	1.30	0.69	1.35	0.70	0.75

TABLE 7 COMPARISONOFVNSATVARIOUSTIMEINTERVALSBETWEENTHEGROUPS

VNS	GroupA		GroupB		Pvalue
	Mean	SD	Mean	SD	
2hours	1.10	3.49	0.41	0.75	0.22
4hours	2.28	0.55	1.70	0.52	0.001
6hours	3.55	0.64	2.30	0.52	0.001
8hours	3.53	0.59	2.25	0.63	0.001
10hours	3.68	0.62	2.73	0.64	0.001
12hours	1.85	0.58	1.58	0.64	0.04
72hours	1.38	0.74	1.43	0.72	0.76

TABLE8-INCIDENCEOFSIDEEFFECTS

Sideeffects	GroupA		GroupB		Pvalue
	n	%	n	%	
Nausea	13	32.5	16	40	0.49
Vomiting	1	2.5	4	10	0.17
Pruritis	2	5	12	30	0.003
Bradycardia	2	5	2	5	1.0
Hypotension	0	0	2	5	0.15
Respiratorydepression	0	0	0	0	NA
Urinaryretention	0	0	1	2.5	0.31
Sedation	0	0	0	0	NA

IV. Results

Mean age of patients of group A was 42.58±13.61 years whereas that ofgroupBwas44.33±13.50years.MajorityofpatientsingroupAbelongedto21 to 40 and 41 to 60 years of age (40% each). Majority of patients ofgroup B belonged to 41 to 60 years of age (42.5%) followed by 37.5%patients belonging to 21 to 40 years of age group. However test ofsignificance(chisquaretest)observednostatisticallysignificantdifferenceinagecompositionofboththegroups(p>0.05).

Inpresentstudy,about77.5%and75%patientsingroupAandgroupB respectivelywerefemales.Thegendercompositioninboththegroupswascomparable(p>0.5).Most common procedure conducted among patients of group A was totalabdominal hysterectomy (30%) followed by exploratory laparotomy (25%)whereas40%patientsofgroupBunderwenttotalabdominalhysterectomy.Test of significance (chi square test) showed no statistically significantdifferenceinprocedureperformedbetweentwogroups(p>0.05). followed by ASA grade II and III. Patients ofboththegroupswerecomparablewithASAgrade(p>0.05).Mean weight in group A was 55.48±10.76 kg and that of group B was56.05±11.72 kg. Mean height of group A was 149.28±6.03 cm whereasmean height of group B was 150.8±6.99 cm. Mean BMI of group A was25.92±4.73 kg/m^2 and mean BMI of group B was 24±4.79 kg/m^2. BMI ofboththegroupswasstatisticallysimilar(p>0.05).

Inpresentstudy,majorityofpatientsofgroupAhadmallampatiscore2 (40%)followedbymallampattiscore3(32.5%)whereasmajorityof patientsofgroupBhadMallampattiscore1followedby2and3i.e.38.5%, 35.9%and25.6%respectively.However,testofsignificanceshowedno statisticallysignificantdifferenceinmallampattiscoreofboththegroups(p>0.05).

MeanonsetofsensoryblockadeingroupAwas18.08±2.04minutewhereas that in group B was 13.68±2.44 minutes. Test of significance(unpairedttest)showedstatisticallyhighlysignificantdifferenceinonsetofsensoryblockade(p<0.001).MeanonsetofmotorblockadeingroupAwas35.35±2.97minuteswhereas that of group B was 34.23±2.61 minutes. The difference in meanonsetofmotorblockadebetweentwogroupswasstatisticallyinsignificant(p>0.05).

Mean duration of analgesia in group A was165.48±10.19 minutes whereasmean duration of analgesia in group B was 178.53±8.36 minutes and theobserveddifferencewasstatisticallysignificant(p<0.05).Inpresentstudy,meandurationofrescuetopupingroupAwas6.80±1.09 hours whereas that in group B was 10.65±2.24 hours and the

observeddifferencebetweentwogroupswasstatistically highlysignificant($p<0.01$).The present study observed no statistically significant difference in meanheartratebetweentwogroupsatvarioustimeintervals($p>0.05$).GroupArequiredsignificantlyhighernumberofrescuetopup(3.65±0.70)ascomparedtogroupB(1.43±0.59)($p<0.01$).
Postoperatively VAS score was calculated for individual patients in both thegroupstoassessthepain.PainseverityasrevealedbyVASwassignificantlyhigheringroupApatientsascomparedtogroupBduring4to12hourspostoperativeduration($0<0.05$).MeanpainaselicitedbyVerbalnumericalscalewassignificantlyhigheringroupApatientsascomparedtogroupBduring4to12hourspostoperativeduration($0<0.05$).
Inpresentstudyitwasobservedthatoccurrenceofpruritiswassignificantlyhigherinpatientsofgroup Bascomparedtogroup A($p<0.01$)whereas no such difference was observed for the incidence of other sideeffectsbetweentwogroups($p>0.05$).

STATISTICAL ANALYSIS:
The collected data was summarized by using frequency, percentage, mean & S.D. To compare the qualitative outcome measures Chi-square test or Fisher's exact test was used. To compare the quantitative outcome measures Independent t test was used. If data was not following normal distribution, Mann Whitney U test was used. SPSS version 22 software was used to analyse the collected data.
DatawascompiledusingMsExcelandanalysed. Numerical data wasexpressed asmeanandstandarddeviationwhereasgroupeddatawasexpressedasfrequencyandpercentage.Unairedttestwasapplied toassessthedifferenceinthemeans of two groups whereas chi square test was applied to assess thedifferenceinthegroupeddata.Pvalueof<0.05wasconsideredstatisticallysignificantandthepvalueof<0.001wasconsideredstatisticallyhighlysignificant.

V. Discussion

Ropivacaine is a long-acting amide-type local anaesthetic, released for clinical use in 1996. Extensive clinical data have demonstrated that epidural 0.2% ropivacaine is nearly identical to 0.2% bupivacaine with regard to onset, quality and duration of sensory blockade for initiation and maintenance of analgesia. Ropivacaine also provides effective pain relief after abdominal or orthopaedic surgery, especially when given in conjunction with opioids or other adjuvants. In summary, ropivacaine, a newer long-acting local anaesthetic, has an efficacy generally similar to that of the same dose of bupivacaine with regard to postoperative pain relief, but causes less motor blockade and stronger vasoconstriction at low concentrations.[17]

Scott DA et al did comparison of Epidural Ropivacaine Infusion Alone and in Combination with 1, 2, and 4 [micro sign] g/mL Fentanyl for Seventy-Two Hours of Postoperative Analgesia After Major Abdominal Surgery. Effective epidural neural blockade was established before surgery; postoperatively, the infusion rate was titrated to a maximum of 14 mL/h for analgesiaIn this blinded, prospective study, we compared four different epidural infusion solutions for efficacy and side effects over a clinically useful postoperative period and conclude that an epidural infusion of ropivacaine 2 mg/mL with fentanyl 4 [micro sign]g/mL was most effective.[18]

In a similar study ,Liu SS et al did comparison of three solutions of ropivacaine/fentanyl for postoperative patient-controlled epidural analgesia. Use of a lower concentration of ropivacaine-fentanyl may further improve analgesia or decrease side effects.Thirty patients undergoing lower abdominal surgery were randomized in a double-blinded manner to receive one of three solutions: 0.2% ropivacaine-4 microg fentanyl 0.1% ropivacaine-2 microg fentanyl, or 0.05% ropivacaine-1 microg fentanyl for patient-controlled epidural analgesia after standardized combined epidural and general anesthesia. Pain scores (rest, cough, and ambulation), side effects (nausea, pruritus, sedation, motor block, hypotension, and orthostasis), and patient-controlled epidural analgesia consumption were measured for 48 h.All three solutions produced equivalent analgesia. Motor block was significantly more common (30 vs. 0%) and more intense with the 0.2% ropivacaine-4 microg fentanyl solution. Other side effects were equivalent between solutions and mild in severity. Lesser concentrations of ropivacaine and fentanyl provide comparable analgesia with less motor block despite the use of similar amounts of ropivacaine and fentanyl. This finding suggests that concentration of local anesthetic solution at low doses is a primary determinant of motor block with patient-controlled epidural analgesia after lower abdominal surgery.[19]

Hodgson PS et al did a comparison of ropivacaine with fentanyl to bupivacaine with fentanyl for postoperative patient-controlled epidural analgesia. Ropivacaine for patient-controlled epidural analgesia (PCEA) may facilitate postoperative patient mobilization because it causes less motor block than bupivacaine. Forty patients undergoing abdominal surgery were randomized in a double-blinded manner to the following: 0.05% bupivacaine/4 μg fentanyl, 0.1% bupivacaine/fentanyl, 0.05% ropivacaine/fentanyl, or 0.1% ropivacaine/fentanyl for standardized PCEA. We measured pain scores, side effects, and PCEA consumption for 42 h. Lower-extremity motor function was assessed with electromyography and isometric force

dynamometry. Analgesia was equivalent among groups. PCEA with bupivacaine/fentanyl and ropivacaine/fentanyl as 0.05% or 0.1% solutions appears clinically equipotent. Lower-extremity motor function decreases, but is unlikely to result in prolonged inability to ambulate. Use of a 0.05% solution may be advantageous to decrease local anesthetic use and prevent transient motor block.[20]

Berti M et al studied patient supplemented epidural analgesia after major abdominal surgery with bupivacaine/fentanyl or ropivacaine/fentanyl and compared analgesic efficacy and occurrence of motor block and other side effects during patient supplemented epidural analgesia (PSEA) .Using a ropivacaine 0.2% /2 μg · ml^{-1} fentanyl mixture for patient supplemented epidural analgesia after major abdominal surgery provided similar successful pain relief as bupivacaine 0.125% /2μg · ml^{-1} fentanyl, but patients receiving bupivacaine/fentanyl requested more supplemental.[9]

Postoperative analgesia was studied by continuous extradural infusion of ropivacaine after upper abdominal surgery by Schug SA et al.The main aim of this study was to investigate the dose-response relationship of extradural infusion of ropivacaine. Pain on coughing was significantly less in all ropivacaine groups than in the saline group after 4 h infusion . Motor block was negligible throughout the infusion. Patient satisfaction was higher in the 0.2% and 0.3% ropivacaine groups .[21]

Macias A et al did randomized, double-blinded comparison of thoracic epidural ropivacaine, ropivacaine/fentanyl, or bupivacaine/fentanyl for postthoracotomy analgesia.They assessed pain scores (rest and spirometry), IV morphine consumption, spirometry, hand grip strength, $Paco_2$, heart rate, blood pressure, respiratory rate, and side effects (sedation, nausea, vomiting, and pruritus) for 48 h. Thoracic epidural ropivacaine/fentanyl provided adequate pain relief similar to bupivacaine/fentanyl during the first 2 postoperative days after posterolateral thoracotomy. Patients in the ropivacaine group experienced more pain and performed worse in spirometry than patients who received epidural fentanyl. There was no significant difference in motor block. We conclude that epidural ropivacaine/fentanyl offers no clinical advantage compared with bupivacaine/fentanyl for postthoracotomy analgesia.Their results were in contrast to our study results.[22]

Pitimana-aree S et al did an economic evaluation of bupivacaine plus fentanyl versus ropivacaine alone for patient-controlled epidural analgesia after total-knee replacement procedure.It was a double-blinded randomized study.This study compared the cost effectiveness of patient-controlled epidural analgesia (PCEA) with 0.0625% bupivacaine plus fentanyl (BF) 3 μg/mL versus 0.15% ropivacaine alone (R) during the first 48 hours after TKR procedure. Visual analog scale (VAS) pain score at rest and upon movement, side effects, and cost of treatment were compared. Nevertheless, patient satisfaction with pain management was higher in the BF group compared with that in the R group. In addition, pain treatment with bupivacaine and fentanyl was 18% less costly compared with ropivacaine alone.Considering the economic evaluation,it was concluded that PCEA with 0.0625% bupivacaine plus fentanyl 3 μg/mL is more cost effective and provides more patient satisfaction than PCEA with ropivacaine alone. [23]

Kim SH et al did a patient-controlled epidural analgesia with ropivacaine and fentanyl experience with 2,276 surgical patients. Their data suggest that the use of PCEA provides proper analgesia in the postoperative 48 h period after a wide variety of surgical procedures and that is associated with few serious complications. However, more careful pain management and sustainable PCEA monitoring considering the type of surgical procedure undergone is needed in patients with PCEA.[24]

Lee WK et al ropivacaine 0.1% with or without fentanyl for epidural postoperative analgesia: a randomized, double-blind comparison. There was no statistical difference in patient profile between the groups. Pain relief scores were similar in the two groups in the first hour after the drugs were given. However, pain relief was significantly better in the ropivacaine/fentanyl group after the first hour and this difference lasted for the remaining time. There was no significant difference in adverse events between the two groups during 24 hours of assessment. In conclusion, the quality of analgesia was significantly improved by the addition of fentanyl 1 μg/mL to ropivacaine.[25]

CONCLUSIONBased on the findings of present study itcouldbeconcludedthataddition of fentanyl has significant effect on onset of motor block i.e.meanonsetofsensoryblockadewas18.08±2.04inropivacainegroup whereas that in patients receiving ropivacaine with fentanylwas13.68±2.44minutes.However,fentanylhasnoeffectonprolongationofmotorblockand onsetofmotorblock(p>0.05).Meandurationofanalgesiawas165.48±10.19minutesinropivacainegroup whereas addition of fentanyl in group significantly increaseddurationofanalgesiai.e.178.53±8.36minutes

DECLARATIONS:

Funding: None **Conflicts of interest/Competing interests**: None **Availability of data and material**: DepartmentofAnaesthesiology,L.N.MedicalCollegeandResearchCentreandassociated J.KHospital,Bhopal**Code availability**: Not applicable **Consent to participate**: Consent taken **Ethical Consideration**: There are no ethical conflicts related to this study. **Consent for publication**: Consent taken

WHAT THIS STUDY ADD TO EXISTING KNOWLEDGE

Ropivacaineusedaloneepidurallyisa good drug but is associatedwith significant failure rates in providing routine analgesia resulting fromregression of the sensory block and the unacceptable incidence ofmotorblockadeandhypotension.A low dose of fentanyl is known to markedly improve the analgesicefficacyofbupivacainewheninfusedepidurallyaftermajorabdominalsurgery.

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REFERENCES

[1]. Hurley R, Wu C. Acute postoperative pain. In: Miller RD, editor. MillersAnesthesia.7thed.Philadelphia:ChurchillLivingstone,Elsevier;2010: 2758-60.

[2]. RonyRY,FortierMA,ChorneyJM,PerretD,KainZN.Parental postoperativepainmanagement:attitudes,assessment,and management.Pediatrics.2010Jun1;125(6):e1372-8.

[3]. ArizaF,Rodriguez-MayoralH,VillarrealK.Epiduralanalgesiain abdominalmajorsurgery:pros,cons,andunresolvedissuesbeyond paincontrol.Revistacolombianadeanestesiologia.2018Jun;46(2):175-6.

[4]. NimmoSM,HarringtonLS.Whatistheroleofepiduralanalgesiain abdominalsurgery?.ContinuingEducationinAnaesthesia,Critical Care&Pain.2014Oct1;14(5):224-9.

[5]. HansenTG.Ropivacaine:apharmacologicalreview.Expertreviewofneurotherapeutics.2004Sep1;4(5):781-91.

[6]. MarkhamA,FauldsD.Ropivacaine.Drugs.1996Sep1;52(3):429-49.

[7]. StienstraR.TheplaceofropivacaineinanesthesiaActaanaesthesiologicaBelgica.2003;54(2):141-50.

[8]. KuthialaG,ChaudharyG.Ropivacaine:Areviewofitspharmacologyandclinicaluse.Indianjournalofanaesthesia.2011Mar;55(2):104.

[9]. BertiM,Fanelli G,CasatiA,AlbertinA,PalmisanoS,DeniF,PerottiV, TorriG.Patientsupplementedepiduralanalgesiaaftermajorabdominal surgery with bupivacaine/fentanyl or ropivacaine/fentanyl.Canadianjournalofanesthesia.2000Jan1;47(1):27.

[10]. LakshmiK,KumariMP,SunilR.Acomparisonoftheanalgesic efficacyandsafetyofepiduralbupivacainewithfentanylandropivacaine with fentanyl in abdominal surgery. Ain-Shams Journal ofAnaesthesiology.2015Oct1;8(4):623.

[11]. MaciasA,MonederoP,AdameM,TorreW,FidalgoI,HidalgoF. Arandomized,double-blindedcomparisonofthoracicepiduralropivacaine,ropivacaine/fentanyl,orbupivacaine/fentanylfor postthoracotomyanalgesia.Anesthesia&Analgesia.2002Nov1;95(5):1344-50.

[12]. MogensenT,HjortsøNC,BiglerD,LundC,KehletH. Unpredictability of regression of analgesia during the continuouspostoperativeextraduralinfusionofbupivacaine.Britishjournalof anaesthesia.1988Apr1;60(5):515-9.

[13]. TsukadaS,WakuiM,HoshinoA.Paincontrolafter simultaneousbilateraltotalkneearthroplasty:arandomizedcontrolledtrialcomparingperiarticularinjectionandepiduralanalgesia.JBJS.2015Mar4;97(5):367-73.

[14]. KayaT,Büyükkoçak U,BaşarH,SağsözN.Comparisonof epidural ropivacaine 0.2% and ropivacaine 0.2% in combination withsufentanil 0.75 microg mL-1 for postcaesarean analgesia. Agri: Agri(Algoloji)Dernegi'ninYayinorganidir=TheJournaloftheTurkishSocietyofAlgology.2008Oct;20(4):30-7.

[15]. Pitimana-areeS,VisalyaputraS,KomoltriC,MuangmanS, TiviraJS,PuangchanS,Immark P.Aneconomicevaluationof bupivacaineplusfentanylversusropivacainealoneforpatient-controlled epidural analgesia after total-knee replacement procedure:a double-blinded randomized study. Regional Anesthesia & PainMedicine.2005Sep1;30(5):446-51.

[16]. NiemiG,BreivikH.Epiduralfentanylmarkedlyimprovesthoracicepiduralanalgesiainalow-doseinfusionofbupivacaine, adrenalineandfentanyl:Arandomized,double-blindcrossoverstudy withandwithoutfentanyl.Actaanaesthesiologicascandinavica.2001Feb;45(2):221-32.

[17]. Zink W, Graf BM. Benefit-risk assessment of ropivacaine in the management of postoperative pain. Drug safety. 2004 Dec;27(14):1093-114.

[18]. Scott DA, Blake D, Buckland M, Etches R, Halliwell R, Marsland C, Merridew G, Murphy D, Paech M, Schug SA, Turner G. A Comparison of Epidural Ropivacaine Infusion Alone and in Combination with 1, 2, and 4 [micro sign] g/mL Fentanyl for Seventy-Two Hours of Postoperative Analgesia After Major Abdominal Surgery. Anesthesia & Analgesia. 1999 Apr 1;88(4):857-64.

[19]. Liu SS, Moore JM, Luo AM, Trautman WJ, Carpenter RL. Comparison of three solutions of ropivacaine/fentanyl for postoperative patient-controlled epidural analgesia. The Journal of the American Society of Anesthesiologists. 1999 Mar 1;90(3):727-33.

[20]. Hodgson PS, Liu SS. A comparison of ropivacaine with fentanyl to bupivacaine with fentanyl for postoperative patient-controlled epidural analgesia. Anesthesia & Analgesia. 2001 Apr 1;92(4):1024-8.

[21]. Schug SA, Scott DA, Payne J, Mooney PH, Hägglöf B. Postoperative analgesia by continuous extradural infusion of ropivacaine after upper abdominal surgery. British journal of anaesthesia. 1996 Apr 1;76(4):487-91.

[22]. Macias A, Monedero P, Adame M, Torre W, Fidalgo I, Hidalgo F. A randomized, double-blinded comparison of thoracic epidural ropivacaine, ropivacaine/fentanyl, or bupivacaine/fentanyl for postthoracotomy analgesia. Anesthesia & Analgesia. 2002 Nov 1;95(5):1344-50.

[23]. Pitimana-aree S, Visalyaputra S, Komoltri C, Muangman S, Tiviraj S, Puangchan S, Immark P. An economic evaluation of bupivacaine plus fentanyl versus ropivacaine alone for patient-controlled epidural analgesia after total-knee replacement procedure: a double-blinded randomized study. Regional Anesthesia & Pain Medicine. 2005 Sep 1;30(5):446-51.
[24]. Kim SH, Yoon KB, Yoon DM, Kim CM, Shin YS. Patient-controlled epidural analgesia with ropivacaine and fentanyl: experience with 2,276 surgical patients. The Korean journal of pain. 2013 Jan;26(1):39.
[25]. Lee WK, Yu KL, Tang CS, Lee LS, Fang HT, Au CF. Ropivacaine 0.1% with or without fentanyl for epidural postoperative analgesia: a randomized, double-blind comparison. The Kaohsiung journal of medical sciences. 2003 Sep 1;19(9):458-62.