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CLINICAL INVESTIGATIONS

IS CONTINUOUS INFILTRATION OF LOCAL ANAESTHETIC/PCA AN ACCEPTABLE ALTERNATE PAIN MANAGEMENT STRATEGY IN MORBIDLY OBESE PATIENTS UNDERGOING GASTRIC BYPASS SURGERY? A RETROSPECTIVE COMPARISON WITH EPIDURAL ANALGESIA

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Background:
Not like in general population, in obese siting the epidural catheter is a time consuming process and needs high level of nursing care during the postoperative period. In our institution we have done more than 1000 gastric bypasses over the last decade, most of them with postoperative epidural analgesia. Because of draw backs with epidural technique, recently we changed our practice to continuous infiltration/PCA technique. This is an attempt to see whether new technique is offering the same quality of analgesia to our gastric bypass patients during their postoperative stay.

Methods:
All the patients who had either epidural or PCA/continuous infiltration as their primary mode of analgesia, following gastric bypass surgery during the period of 1st June 2008 and 28th February 2009 were taken in to consideration. Pain was rated by the patient using VAS score at 0,2,6,12,24,36,48,72,96 hours and overall patient satisfaction at end of 96 hours. Side effects were also noted.

Results:
Out of 98 patients, only 87 patients (epidural 62, continuous infiltration / PCA 25) were considered in this study. Rest had either PCA alone (8 patients) or combination of epidural / PCA (intentionally - 1,convertion of epidural to PCA - 2). Epidural group consisted of 21 (33.9%) males, 41 (66.1) females, age 48.2+/-10.4 (23-69 years), BMI 48.9+/-9.66 (34-86) and PCA/infiltration group 3 (12%) males, 22 (88%) females, age 47.36 + /- 12.08 (19-71) BMI 46.6 + /-7. 65 (36-65). Continuous infiltration / PCA provided same degree of pain relief as epidural infusion. Except for nausea and vomiting (60%), other side effects were less with continuous infiltration/PCA (pruritus, urinary retention, wound infection). 11.3% of epidurals group developed hypotension and 36% of infiltration / PCA group mentioned oozing as a side effect. In epidural group 13% rated it as excellent, 37% as very good, 50% as good while in infiltration/PCA group 36% related as excellent ,48% as very good and 16% as good.

Conclusion:
Continuous infiltration/PCA technique provides equally effective postoperative analgesia after gastric bypass surgery, compared to epidural infusion, with comparatively less side effects and more patient satisfaction.

The effective relief of pain is of paramount importance to anyone treating patients undergoing surgery. This should be achieved for humanitarian reasons, but there is now evidence that pain relief mean a smoother postoperative course with earlier discharge from hospital. It may also reduce the onset of chronic pain syndromes. The goal for postoperative pain management is to reduce or eliminate pain and discomfort with minimum side effects as cheaply as possible.

The site of the surgery has a profound effect upon the degree of postoperative pain a patient may suffer. Operations on the thorax and upper abdomen are more painful than operations on the lower abdomen. In particular, operations on the thorax or upper abdomen may produce widespread changes in pulmonary function, an increase in abdominal muscle tone and an associated increase in diaphragmatic function. The result will be an inability to cough and clear secretions which may lead to lung atelectasis and pneumonia.

It is a challenge to achieve satisfactory pain relief in the obese and this group is at a high risk of developing postoperative thromboembolic, pulmonary and other complications and the risk is kept at a minimum by regional analgesic techniques such as epidural analgesia.(1) Placement of an epidural catheter in obese patients is a time consuming, technically challenging effort, which is openly admitted by the use of ultra sound in finding the epidural space.(2) There is growing emphasis on less demanding modes of analgesia such as continuous wound infiltration with local anaesthetic combined with systemic medications to achieve multimodal analgesia. In our institution FOBI gastric bypass surgeries are being done for more than 15 years and epidural analgesia was offered as the 1st choice. Recently, the practice was changed to continuous infiltration/PCA technique. In our experience, even though epidurals offered good pain relief, it creates some technical and practical issues and requires a high level of nursing care, which prompted us to look for an alternative method.

The primary objective of this study was to determine whether epidural technique for analgesia can be superseded by a simple continuous local infiltration of the wound with PCA in patients undergoing open FOBI gastric bypass surgery.

Methods

This is a descriptive study of consecutive case series, enrolling for FOBI gastric bypass surgery at the Wakefield hospital in the city of Wellington, between 1st June 2008 and 28th of February 2009. Patients who had epidural or continuous infiltration of the wound with PCA as their main analgesic mode were selected for this study.

All surgeries were performed by the senior author(RSS) who has performed over 1100 gastric bypass operations since 1986. It is done with a mid line incision extending from xiphi sternum to the umbilicus and a schematic representation of the operation performed is shown in Figure 1.

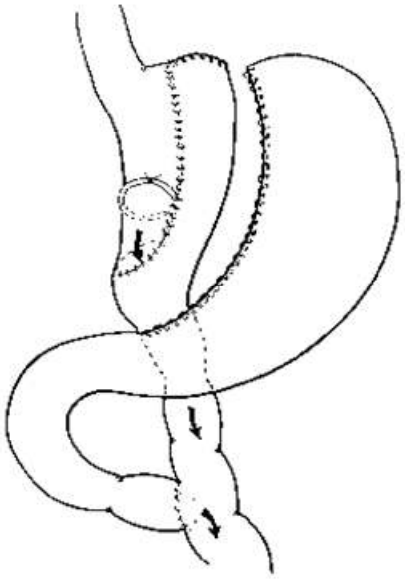


Figure 1

Patients were discharged on the sixth post operative day, unless they developed complications. All the surgeries were carried out under a standard general anaesthetic and the duration of the surgery was approximately 2.5 hours. No premedication was used. Induction was done with propofol 2mg/kg, fentanyl upto 10ug/kg. Either vecuronium or rocuronium was used as a muscle relaxant. Single dose of cefazolin 2g iv or ciprofloxacin 500mg iv(those who are allergic to cefazolin)was given as prophylactic antibiotic. Anesthesia was maintained during the surgery with desfluarane in air/O_2. Cox inhibitor

(Dynastat 40mg)was given during the anaesthetic and continued subsequently on a daily basis with regular paracetamol. Postoperative pain management followed routine protocols established by the Wakefield Hospital and adequate pain relief was defined as a score <2 on a visual analogue scale. Tramadol was used as rescue analgesia.

Group A - received a thoracic epidural catheter placed before the general anaesthetic and local anaesthetic solution was used to achieve good pain relief(2% lignocaine 5ml test dose, intraoperative 2% lignocaine upto 20 ml or ropivacaine 0.6% up to 10ml and postoperatively 0.125% bupivacaine or 0.2% ropivacaine with fentanyl 2ug/ml infusion for 96 hours).Type of local anesthetic was not considered as a study end point as it was assumed that it did not affect the outcome parameters. [15]

Group B – received 0.25% bupivacaine 20ml bolus, through a catheter placed at the upper midline incision, just before recovery from the general anaesthetic. Same local anaesthetic solution was used in the postoperative period at 5ml/hr infusion rate using a balloon pump. (On Q pain relief system). At the end of 72 hours the catheter was removed. Morphine PCA (1 mg morphine with a lockout interval of 5 minutes) without background infusion was used in combination and omitted with cessation of use. Only infiltration group received Morphine intraoperatively up to 10mg.

Primary end point of this study is to evaluate analgesic efficacy of combined PCA/infiltration technique compared to standard thoracic epidural approach in patients undergoing FOBI gastric bypass surgery. To achieve this pain was assessed with a visual analog scale (VAS) from 1 to 5 (where 1=no pain, 2=mild, 3=moderate, 4=severe, 5=unbearable) at 0, 2, 6, 12, 24, 36, 48, 72, 96 hours. Number was expressed by the patient and charted in a postoperative observation chart by nursing staff. Patient's overall view was charted at the end of 96 hours and it was done by two anaesthetic registrars. (not satisfied=0 good=1, very good=2 excellent=3). We also monitored the side effect profile of each method.

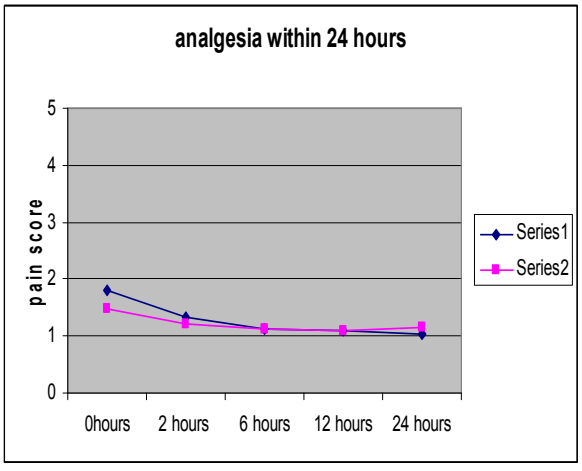
Patient's charts were analysed for biometric data (gender, age, BMI, co morbidities) and pain scores assessed at each time point. Charts were reviewed for episodes of nausea, vomiting, pruritus, urinary retention requiring catheterization, systolic blood pressure less than 90mm Hg which needed intervention and occurrence of any other cardio vascular, pulmonary and infectious complications which required antibiotics during their hospital stay. Patients were reviewed after 6 weeks at the clinic for any late wound infection. All the numerical data were expressed as median+/- standard deviation with a range. A p value <0.05 was considered as statistical significance. Average pain scores at each time point were compared.

Results

During the study period total of 98 patients underwent gastric bypass surgery. 3 patients got PCA only as their main analgesic mode and another patient both PCA and Epidural during the postoperative period. Out of 69 patients who were offered epidural, in 5 placement failed (7.24%). Two other patients who had successful epidural catheter placement were converted to PCA due to unsatisfactory pain relief.

Epidural study group (group a) consisted of 62 patients and PCA/infiltration group consisted of 25 patients. 12(19.3%) patients from epidural group and 2(8%) needed Tramadol for breakthrough pain.

Figure 2



Demography of study population

Figure 3

	Epidural	PCA/Local anaesthetic infiltration	
Gender	Male 21(33.9%)	3(12%)	
	Female 41(66.1%)	22(88%)	
Age	48.2+/-10.4(23-69)	47.36+/-12.08(19-71)	t-test p=0.7678
BMI	48.9+/-9.66(34-86)	46.6+/-7.65(36-65)	t-test p=0.251
Co morbidities			
B. Asthma	15(24.2%)	9(36%)	Chi Square p=0.264
Diabetes	19(30.6%)	5(20%)	Chi Square p=0.314
Hypertension	29(46.7%)	8(32%)	Chi Square p=0.207

Figure 4

Side effect profile

	Epidural	PCA/Local anaesthetic infiltration	
Nausea/vomiting	**26 (41.9%)**	**15(60%)**	**Chi Square p=0.126**
Pruritus	**9 (14.5)**	**2 (8%)**	**Chi Square p=0.407**
Urinary retention	**8 (12.9)**	**1(4%)**	**Chi Square p=0.217**
Wound infection	**6(9.7%)**	**1 (4%)**	**Chi Square p=0.378**
Oozing from the wound	**-**	**9 (36%)**	
Blood pressure<90mm Hg	**7(11.3%)**	**-**	
Chest infection	**-**	**-**	
DVT/PE	**-**	-	

Pain assessment with VAS score

Series 1=PCA/anaesthetic infiltration
Series 2=Epidural

Series 1=PCA/anaesthetic infiltration
Series 2=Epidural

Figure 5

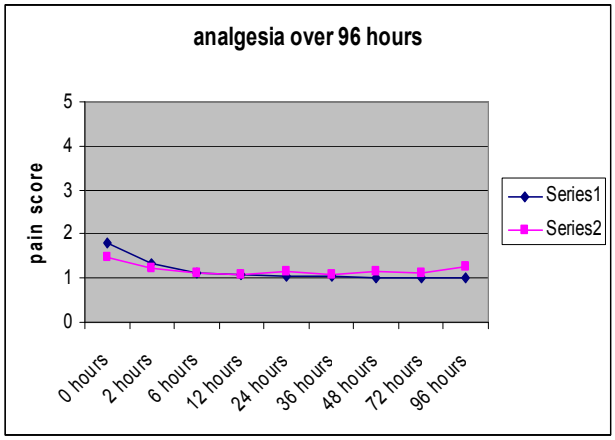


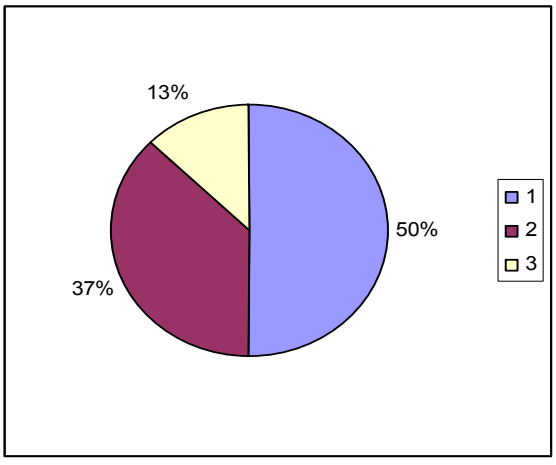
Figure 6

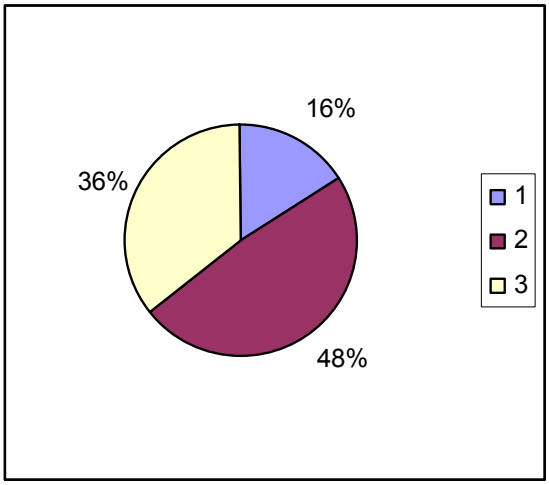
		Intervention					
		Epidural		PCA/Infiltration			
Time	Score	Count	Column N%	Count	Column N%	Chi-Square	7.505
0	1	35	56.5%	13	52.0%	df	2
	2	24	38.7%	6	24.0%	Sig	0.023
	3	3	4.8%	4	16.0%		
	4	0	0.0%	2	8.0%		
2	1	51	82.3%	18	72.0%	Chi-Square	1.143
	2	9	14.5%	6	24.0%	df	1
	3	1	1.6%	1	4.0%	Sig	0.285
	4	1	1.6%	0	0.0%		
6	1	55	88.7%	22	88.0%	Chi-Square	0.009
	2	7	11.3%	3	12.0%	df	1
						Sig	0.925
12	1	57	91.9%	23	92.0%	Chi-Square	0.465
	2	4	6.5%	2	8.0%	df	2
	3	1	1.6%	0	0.0%	Sig	0.792
24	1	53	85.5%	24	96.0%	Chi-Square	1.937
	2	9	14.5%	1	4.0%	df	1
						Sig	0.164
36	1	57	91.9%	24	96.0%	Chi-Square	0.458
	2	5	8.1%	1	4.0%	df	1
						Sig	0.498
48	1	53	85.5%	25	100.0%	Chi-square	4.048
	2	9	14.5%	0	0.0%	df	1
						Sig	0.044
72	1	55	88.7%	25	100.0%	Chi-Square	3.070
	2	7	11.3%	0	0.0%	df	1
						Sig	0.80
96	1	47	75.8%	25	100.0%	Chi-Square	7.308
	2	15	24.2%	0	0.0%	df	1
						Sig	0.007

Patient satisfaction

Epidural
PCA/Infiltration

Figure 7





1=Good 2=Very good 3=Excellent

Logistic regression good verses v. good /excellent

Epidural had 6.4 times higher probability of ending up with "good" satisfaction rather than "v. good/excellent" satisfaction.

Discussion

It has been assumed that adequate pain relief will improve the surgical outcome with reduced morbidity, need for hospitalization and convalescence and there is a common census that optimal pain relief is a prerequisite for postoperative recovery.[3] Obesity carries an increased risk of postoperative pulmonary, cardiovascular and thromboembolic events and complex psychosocial issues which may contribute to management difficulties. Early mobilization is one strategy towards less postoperative complications among obese.[4][5] An important factor influencing postoperative activity is the level of postoperative pain, which is partially decided by the type of incision. Traditionally FOBI gastric bypass surgeries are done using upper midline incision, requiring adequate postoperative pain relief.

Among the commonly used pain relieving techniques (PCA with opioids, NSAIDS, Epidural) there is evidence that epidural local anaesthetic or local anaesthetic-opioid techniques are the most effective in providing dynamic pain relief after major surgical procedures.[6][7] Therefore thoracic epidural techniques have been used extensively in open bariatric surgeries. Questions are being raised about the benefit towards reduced pulmonary complications with epidural technique.[3]

Epidural related infections, potential neurological complications, placement failure and other technical complications are few, of the more common complications among obese with epidural technique.[8] With difficulty in appreciating anatomical land marks, epidural procedure per se will increase the theater time, which is somewhat addressed by imaging techniques to locate the epidural space. When hooked up to an epidural pump, patients feeling of freedom will be limited and requires high level of nursing care to avoid complications. In our epidural group at least one out of five were affected with either urinary retention or hypotension (SBP< 90 mmHg).

PCA remains as an option in postoperative pain relief after gastric bypass surgery, perhaps a better choice according to some studies.[9] All opioids, irrespective of the route of administration but dependent on effect site concentrations may cause significant or even life threatening respiratory depression.[6] Hypercapnia was seen among PCA group, in the presence of normal respiratory rates and SpO_2 values in one study.[1] Decreased lung volumes after surgery is a principal cause of postoperative pulmonary complications. Obesity may lead to restrictive pulmonary physiology and may further reduce lung volumes and the ability to take a deep breath after surgery. However, studies evaluating clinically meaningful pulmonary complications after surgery have generally found no increased risk, even for patients with morbid obesity. However postoperative pulmonary complication rates may be higher among patients with obstructive sleep apnea.[10]

Adequate tissue oxygen tension is an essential requirement for surgical wound healing. Some studies show that epidurals provide better wound tissue oxygen tension compared to intravenous morphine analgesia.[1] Effect upon the respiratory function in combined use of continuous infiltration-PCA technique remains to be evaluated.

Single local infiltration of local anesthetic provides good immediate postoperative analgesia.

[12] Multimodal analgesia provides a better analgesic coverage and is advised by the WFOA and a technically sound approach as pain from surgery has three major components (tissue injury, nociceptor stimulation, activation of central pathways).[13] A single injection approach can cause analgesic gaps and can alter the quality of analgesia, hence the requirement of a safe simple, non expensive, patient independent delivery system which maintains continuous satisfactory analgesia level. According to some studies continuous infiltration of the wound with specially designed catheters fulfill this requirement.[4] [11] [17] [18] Interestingly some studies showed reduction in narcotic requirement when used in tandem.[17] [18]

In our study both groups were affected with nausea. Validity of blaming the analgesic technique for this is in doubt as many other factors can trigger nausea during the immediate postoperative period. Apart from leaking local anesthetic from the incision, which is a technical failure, no other significant proportion of side effects were seen with continuous infiltration technique

Conclusion

Continuous infiltration with local anesthetic / PCA technique provides similar analgesia with less side effects and higher patient satisfaction in obese patients undergoing FOBI gastric bypass surgery compared to thoracic epidural analgesia.

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