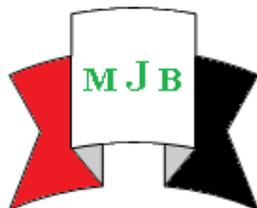


## Outcome of Anorectal Surgery Under A Mixture of Local Anesthesia: Experience With 350 Patients

Ibrahim Falih Noori

College of Medicine, Basra University

E-mail:dr\_ibrahimalsubaiee@yahoo.com



Received 23 June 2014

Accepted 9 September 2014

### Abstract

**Background:** anal diseases are common surgical problems .Anal surgical operations are usually carried out under general anesthesia and spinal anesthesia. The use of local anesthesia in anal surgery is supposed to be safe, simple and efficient.

**Purpose:** to evaluate the effectiveness and usefulness of local anesthesia for various anal surgeries, and to assess the patient acceptance and satisfaction.

**Patients and methods:** a total of 350 patients with various anal problems presented to different anal surgeries under local anesthetic infiltration for the period from February 2011 to March 2014.Age ranges from 18-72 years (mean 47.7 year).Majority of the patients were males (No. =310, 88.6%) and minority were females (No. = 40, 11.4%).Pain during surgery and postoperatively was evaluated on a visual analog scale. The feasibility, tolerability and patient's satisfaction with the results of operations were assessed and evaluated.

**Results:** The mean operations time was 25 minutes range from 10-45 minutes. The mean pain score in the day of operation was low, (2.8) and the mean pain score in the first postoperative day was also low (3.3).Most patients (82.85%) were satisfied with the results of operations and they would prefer local anesthesia again for anal surgery in the future were necessary. Complications rate in this study was 10.9% and most these complications managed conservatively.

**Conclusion:** perianal block by local anesthetic infiltration is safe, simple and effective for various anal operations with very high degree of acceptance and satisfaction among patients. It had been found to be associated with low pain score and postoperative complications and faster return to daily social activity. The cost saving had been significant.

**Keywords:** anal surgery, local anesthesia, perianal block.

### الخلاصة

تعتبر أمراض الشرج من المشاكل الجراحية الشائعة. إن جراحات الشرج عادة ما تجرى تحت التخدير العام أو تحت تخدير الحبل الشوكي. إن استخدام التخدير الموضعي في جراحات الشرج يفترض به أن يكون بسيطاً وآمناً وفعالاً.

**الغرض من الدراسة:** تقييم فعالية التخدير الموضعي لمختلف جراحات الشرج مع تقييم قبول وقناعه المرضى بهذا النوع من التخدير المرضي وطريقه العمل: شملت الدراسة على ٣٥٠ مريضاً يعانون من مشاكل شرجية مختلفة خضعوا لعمليات جراحية تحت التخدير الموضعي للفترة من شباط ٢٠١١ إلى آذار ٢٠١٤ تراوحت أعمارهم بين ١٨-٧٢ سنة بمعدل عمري معظمهم كانوا ذكورا (٣١٠ مريضاً، ٨٨.٦%) وشكلت الإناث نسبة ١١,٤% (٤٠ مريضه). لقد تم تقييم مستوى الألم خلال جراحات الشرج المختلفة وبعدها ووفق معيار مرئي متشابه كما تم تقييم ملائمة وتحمل وقناعه المرضى لجراحات الشرج تحت التخدير الموضعي.

**النتائج:** معدل وقت العملية في هذه الدراسة كان ٢٥ دقيقة لفترة تراوحت بين ١٠-٤٥ دقيقة. إن معدل مقياس الألم في يوم العملية كان منخفضاً (٢,٨) كما انه كان منخفضاً في اليوم الأول للعملية (٣,٣). إن معظم المرضى في هذه الدراسة (٨٢,٨٥%) كانوا مقتنعين بنتائج الجراحات المختلفة وكانوا يفضلون التخدير الموضعي لجراحات الشرج مستقبلاً إذا اقتضت الضرورة. كانت مضاعفات العمليات الجراحية بهذه الدراسة ١٠,٩% وتم علاجها تحفظياً.

الاستنتاج: إن التخدير الموضعي لمنطقه حول الشرج هي طريقه بسيطة وآمنه وفعاله لمختلف جراحات الشرج ويقناعه وبقبول لدى معظم المرضى وقد وجد أنها مرتبطة بقياس الم منخفض ومضاعفات جراحية قليلة مع استعاده سريعة للنشاط الاجتماعي اليومي. أضافه إلى كلفته الأقتصادي المنخفضة.

## **Introduction**

**A**norectal diseases are common problems in general surgical practice. The prevalence of these diseases is about 4-5% in adult population<sup>[1]</sup> Surgery is the best treatment for most of these problems like third and fourth degree haemorrhoids, chronic anal fissure, perianal abscess, chronic anal fistula, large perianal haematoma, anal wart and low anal canal and anal margin tumors. Surgery has been increasingly performed as ambulatory procedures using general, regional and local anesthesia. General and spinal anesthesia are considered to be the gold standard anesthetic technique for anal surgery.<sup>[2]</sup> The use of this type of anesthesia usually requires more than one day hospitalization and could be associated with various minor and major complications which may prolong the postoperative hospitalization. Caudal or spinal anesthesia has been used as an alternative to general anesthesia for anal surgery especially for those patients who are unfit for general anesthesia or with comorbidities but it requires a trained anesthetist and has many known complications<sup>[3]</sup>.

Local anesthesia is an alternative mode of anesthesia that surgeons can safely carry out on their own. Local anesthesia produces loss of sensation and muscles paralysis in a circumscribed area of the body by localized effect on peripheral nerve endings<sup>[4]</sup>. Local anesthesia is able to provide full relaxation of the anal canal which is an ideal setting for various anal surgical procedures and it is a safe and effective technique with fewer risks and complications compared with general and spinal anesthesia<sup>[5]</sup> The use of local anesthesia in patient with anal diseases seems to be feasible, tolerable and with

less morbidity, shorter hospital stays and faster returns to normal daily activities. This method of anesthesia allows the operation to begin almost immediately<sup>[6]</sup>

The aim of this study was to present our experience with various anal surgeries carried out under local anesthesia performed for 350 patients and to evaluate the feasibility, tolerability and effectiveness of local anesthesia in various anal surgeries.

## **Patients and Methods**

This is a retrospective study conducted on 350 consecutive patients presented with various anal diseases from February 2011 to March 2014. All patients were informed that they would undergo their operations under local anesthesia and informed consent was obtained from each patient. All operations were done by a single surgeon in a well equipped theater. The types of operations included open haemorrhoidectomy (Milligan-Morgan) and closed haemorrhoidectomy (Ferguson), partial lateral internal sphincterotomy, drainage of perianal abscess, fistulectomy for low anal fistula, excision of anal wart by cauterization, evacuation and excision of perianal haematoma and resection of low anal canal and anal margin tumors. Patients were informed to have clear fluid diet 6 hours and nothings by mouth 3 hours before surgery. Enema was not needed. Routine laboratory investigations were done for each patient including Hb level, WBCs counts, blood sugar and blood urea. ECG was a must for all patients older than 45 years. Patients considered being grade 4 or 5 ASA, those with coagulopathies, benign prostatic hyperplasia, associated colorectal tumor and inflammatory bowel disease were excluded from the study.

## **Technique**

The operations were carried out with patients in lithotomy position. All patients

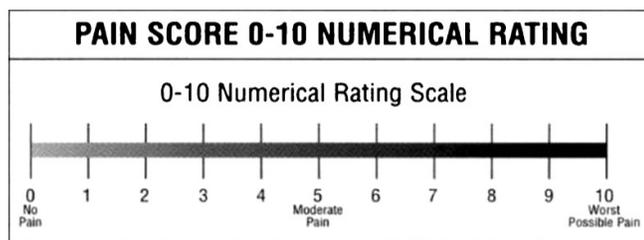
had pulse oximeter monitors and anesthetist was always available in the theater if any emergency arise. Premedication was achieved by intramuscular diclofenac 75mg and tramadol 100 mg injections to ensure conscious sedation during operation. The operation starts with insertion of a cannula but no intravenous fluid administered in order to decrease the rate of postoperative urinary retention especially in middle aged and elderly male patients.

A mixture of 20ml local anesthesia composed of bupivacain hydrochloride 0.5% with lignocain hydrochloride 2% in equal amount with addition of 1-2 ml epinephrine(adrenaline) in a concentration of 1:200,000 and 2-3ml of sodium bicarbonate solution for buffering is injected subcutaneously around the anus using 25G needles to form a subcutaneous circle of local anesthesia (radius of 2.5cm). The left index finger is then inserted as a guide into anal canal. The right hand inserts a syringe with 22G needle containing the same solution into the intersphincteric plain at 3 o'clock position on the above circle. The needle is inserted to the hilt (angle it at 45° laterally) and inject 3-4ml of anesthetic solution slowly as the needle is withdrawn. The same sequences are repeated at 9 o'clock on the left side. After that the needle is inserted at 12 o'clock (angle 45° north) and 3-4 ml of anesthetic solution is injected on withdrawal and again at 6 o'clock (angle 45° south) and the same amount of anesthetic mixture is injected. In each injection of the four quadrants, a gloved left index finger was inserted into the rectum to guide submucosal injection of the local anesthetic. Immediate complete relaxation of both sphincters

ensured. We wait for 3 to 5 minutes and then various anal surgeries performed. After surgery, 2% lignocain gel was applied locally and standard dry dressing was applied. No packing was placed in side anal canal. All patients were evaluated postoperatively after 30 minutes, 60 minutes and 90 minutes and discharged 2 to 4 hours after surgery. On discharge, patients had been given instructions for warm sitz bath in the same evening and twice daily for 5 days after defecation. Patients also had been informed about the probable risks of any possible complications like reactionary hemorrhage and for temporary mild incontinence. Postoperative medications including diclofenac ampoules, oral tramadol, oral metranidazole plus ofloxacin, 5% lidocain gel and lactulose syrup were prescribed for all patients before sent home. Patients were told to contact us after discharge on telephone in case of emergency arise and were offered an appointment for office visit one week after surgery.

Postoperative pain was assessed via visual analog score (0-10 numerical rating scale). Score 0: no pain, score 1-3: mild pain, 4-7: moderate pain and sever pain include NRS 7-10. Patients satisfactions was also assessed and recorded on a four grade scale including very satisfied , satisfied, fair and non satisfied. Lastly, we asked the patients if they would like to consider local anesthesia for anal surgery in the future. Regular activity had been resumed by most patients after 10 -14 days. Follow up of the patients was for at least 6 months. Anal dysfunction was assessed at each visit by asking the patients about flatus and/or fecal incontinence.

**Figure (1): Visual analog scale**



**Results**

Three hundred and fifty patients were included in this study, 310 males and 40 females presented with various anal diseases subjected to different anal surgeries under perianal infiltration by local anesthetics. The vast majority of the patients in our study were males(No.310,88.6 %)while females patients were only 40 patients(11.4%). Age ranges from 18 to 72years with mean age 47.7 year. The anal operations done include open haemorrhoidectomy(Milligan-Morgan)(No.95,27.1%), closed haemorrhoidectomy(Ferguson) (No.79,22.6%), lateral internal sphinctrotomy(No.72,20.6%), low fistulectomy(No.45,12.9%), perianal abscess drainage (No.17,4.9 %), evacuation and excision of perianal haematoma(No.26,7.4 %), resection of perianal warts by

cauterization (No.12,3.4%) and resection of low anal canal and anal margin tumors (No.4,1.1%)(Table 1) .The average operation time including anesthetic infiltration was 25 minutes( range from 10 to 45 minutes).Three to five minutes after local anesthetics infiltration, the anal canal becomes relaxed and dilated and the exposure was excellent allowing introduction of anoscope and examination of the anal mucosa before any intervention. Local or systemic complications of local anesthesia were not noted during or after surgery in patients and additional infiltration of same anesthetic solution was needed in few patients (12 patients) who complained from pain and discomfort during surgery. Conversion to general anesthesia was not needed in all patients.

Anal operation	Male	Female	Total
Open hemoroidectomy(Milligan –Morgan)	83	14	95
Closed hemorrhoidectomy (Ferguson)	71	8	79
Lateral internal sphincterotomy	64	8	72
Low fistulotomy	40	5	45
Drainage of perianal absences	15	2	17
Perianal hematoma evacuation and excision	20	6	26
Anal wart excision	11	1	12
Anal tumor resection	1	3	4
Total	305	45	350

**Table (1):** Distribution of various anal surgeries among patients.

Pain during surgery and postoperatively was assessed and scored on a visual analog scale in which 0 score indicates no pain 10 indicates the worst intolerable pain. The mean pain score during operation was as the following; 2.8 for open haemorrhoidectomy, 3.1 for closed haemorrhoidectomy,1.9 for lateral sphinctrotomy,2.2 for low fistulectomy,3.7 for drainage of perianal abscess,1.8 for evacuation and excision of perianal

haematoma,2.8 for excision of anal wart and 3 for anal tumor resection.(Table2)

In the first postoperative day, the mean pain score was: 3.3 for open haemorrhoidectomy, 2.9 for closed haemorrhoidectomy, 1.4 for lateral sphinctrotomy, 2.8 for low fistulectomy, 2.9 for abscess drainage, 1.8 for excision of perianal heamatoma, 3.3 for anal wart excision and 3.2 for anal tumor resection.(Table2)

Operations	Mean pain score (VAS )*			
	During injection	During operation	1 <sup>st</sup> postoperative day	7 <sup>th</sup> postoperative day
Open hemoroidectomy(Milligan – Morgan)	3.2	2.8	3.3	1.3
Closed hemorrhoidectomy (Ferguson)	3.1	3.1	2.9	0.7
Lateral internal sphincterotomy	2.8	1.9	1.4	0.8
Low fistulotomy	3.6	2.2	2.8	0.8
Drainage of perianal abscesses	3.9	3.7	2.9	0.7
Perianal hematoma evacuation and excision	2.2	1.9	1.8	0.9
Anal wart excision	3.2	2.8	3.3	1.4
Anal tumor resection	3.0	3.0	3.2	1.6

**Table (2):** The mean pain score during and after surgery.  
VAS\* : Pain was scored on a visual analog score (0=no pain, 10=the worst intolerable pain).

Complications during surgery and postoperatively were recorded. Complications rate was 10.9%. No patient had significant primary hemorrhage. Eleven patients (3.1%) had reactionary hemorrhage which presented by anal gauze pack fully soaked by blood and all these patients had been managed successfully by conservative measures after changing the packs and the bleeding stopped spontaneously. Acute urinary retention had been recorded in 8 male patients (2.3 %)

who resolved conservatively by reassurance and analgesics in four patients and only 2 patients only needed Foley catheterization. Only five patients only (1.4%) developed anal stenosis which managed by digital dilatation under local anesthesia. Leakage of fluid feces noticed in 14 patients (4%) who were transient and resolved spontaneously over time. Anal incontinence and recurrence of anal disease had not been recorded in any patients in our study.( Table 3)

Complications	No of patients	percentage
Reactionary bleeding	11	3.1
Acute urine retention	8	2.3
Leakage of the fluid faeces	14	4
Anal stenosis	5	1.4
Incontinence	0	0
Recurrence	0	0

**Table (3):** Complications of various anal surgeries.

The results of the operations were assessed and recorded. Most of the patients in this study were satisfied with the results of surgery (No.290, 82.85%) and according to the results of operations, the patients were classified into: very satisfied (No.140, 40%), satisfied

(No.150, 42.85%), accepted or fair (No.51, 14.57%) and unsatisfied (No.11, 3.14%).Most our patients (No. 296, 84.6%) reported that they would prefer local anesthesia for anal surgery if it is needed in the future (Table 4).

Operation Results Patients	Satisfied		un satisfied		Total
	Very satisfied	satisfied	fair	Un-satisfied	
Male	118	135	42	8	305
Female	22	15	9	3	45
Total	140	150	51	11	3

Table (4): Patients' satisfaction with the procedure.

### Discussion

The anesthesia of choice for anorectal surgery in most hospital is either general or regional anesthesia such as spinal or caudal anesthesia. These forms of anesthesia are not suitable for all patients and are not without complications. In addition, these types of anesthesia did not usually offer good exposure in lithotomy position.<sup>[3,5]</sup> It is believed that most anal surgical procedures can be carried out as ambulatory surgery<sup>[6]</sup>. The selection of anesthetic technique may be the only factor which may prevent ambulatory surgery—especially if general anesthesia or spinal anesthesia are selected which mandate that the patient have to be admitted to hospital one or two days before operation due to the need for preoperative assessment and anesthetic evaluation<sup>[7]</sup>.

Local anesthesia (LA) was first introduced to the anal surgical procedures with aim of controlling pain which is usually accompanies anal surgeries. Later on; it was considered that various anal operations can be done completely under local anesthesia. Surgeries done under local anesthesia have some important advantages which include avoidance of general anesthesia with its related complications, improved

post operative pain relief, early ambulation and subsequent discharge from hospital, reduction in total cost of the procedure and better doctor-patient interaction during the procedure<sup>[4,7,8]</sup>. Local anesthesia with perianal and anal canal block give adequate duration and depth of anesthesia and results in a significant relaxation of anal canal<sup>[9]</sup>.

A mixture of local anesthetic of bupivacain 0.5% and lignocain 2% provides excellent initial pain relief and addition of adrenalin to the mixture reduce the possibility of bleeding during surgery. This mixture provides enough time for not only to do various anal surgical procedures, but also early discharge to the home. Perianal block by local anesthetic infiltration has been suggested as an alternative to general anesthesia or spinal anesthesia for anal surgery<sup>[10, 11]</sup>. Several studies have been shown that local anesthesia provides sufficient relaxation of anal sphincter<sup>[9, 12, 13]</sup>. Nystrom et al<sup>[14]</sup> described a perianal block performed in 30 patients with various anal problems and Gabrielli et al<sup>[13]</sup> performed a posterior block for 400 haemorrhoidectomies. They found that their techniques were complete and satisfactory in more than 90% of the

operations they performed. Marti [2] described posterior perineal block that provide sufficient analgesia during and after anal surgery. Several recent studies [11, 15,16,,] had shown that adequate pain control can be achieved with the use of local anesthesia especially when the patients are fit and psychologically prepared for the procedure. We found in our study that perianal infiltration by a mixture of local anesthesia gives adequate depth and duration of anesthesia and results in sufficient relaxation of sphincters.

Postoperative pain after anal surgery is usually severe since the anoderm is very sensitive and rich with somatic nerve endings [17] So, postoperative pain control is an important concern. We found that premedication given to the patients which included NSAID analgesic (diclofenac) and narcotic (tramadol) besides the effect of local anesthetic mixture solution on the perianal nerve block were very effective in reducing intraoperative and post operative pain .Recent studies [14,18,19,] have shown the safety ,tolerability and feasibility of local anesthesia as a sole anesthetic method for different anal operations. It provides satisfactory sphincters relaxation, decreased hospital stay and cost and much quicker turnover among cases.[19]

Pain appreciated during injection of local anesthesia in addition to burning and pressure sensations are the main drawbacks. Ho et al [17] reported that the application of eutectic lignocain/prilocain (EMLA cream) before injection of anesthetic solution decrease the pain felt during injection .Another study [20] using the same cream before injection for haemorrhoidectomy did not improve any of these symptoms and there was no statistically significant difference between EMLA cream and placebo for decreasing pain during anesthetic infiltration. Scrafone etal [19] suggested that a slow injection rate is associated with less pain due to less

rapid distention of local tissue and activation of fewer nerve endings .Arndt etal [21] noted that rapid injection hurts more than slow infiltration. Gerjy etal [22] proposed that injection of local anesthetic into ischiorectal fossa fat avoid painful injection into sensitive anoderm and intersphinctric space and could be used without sedation. Nystrom etal [14] reported the same results. They suggested that as long as the anesthetic was injected into the ischiorectal fat peripheral to the sphincter, the injection was somewhat painless except for skin puncture. Nivatvong method [23] in which the anesthetic solution is intra-anally injected into submucosa above the dentate line is theoretically painless, but may be difficult for obese patients and those patients with deep or tall buttock cheeks.

The technique of local anesthetic infiltration adapted in our patients by performing a subcutaneous circle of local anesthesia around the anus using 25 G syringe with fine small needle(needle of 1ml insulin syringe) first, followed by slow injection of local anesthetic mixture containing bicarbonate dramatically reduced the pain and burning sensation associated with anesthetic infiltration. The aim is to block the inferior rectal nerve which is a branch of pudendal nerve.

It has been found that perianal block by local anesthesia when combined by ambulatory setting allows anorectal surgery to be performed with a low incidence of urinary retention. This fact was noted in our patients. General anesthesia and spinal anesthesia may cause urinary retention with a reported incidence between 10-17%. [19,24,25]

We found that the pain score during surgery and postoperatively was low and most our patients showed that the operations were tolerable and acceptable and the majority were satisfied with the results of operations(82.8% satisfied).Complications recorded were low(incidence 10.9%) and most of these

complications were managed conservatively. A study of 51 patients at a university hospital in Brazil, in which outpatient haemorrhoidectomy was carried out under local anesthesia concluded that complications did not differ significantly and the cost were] much lower [26]. Another study from colorectal surgery unit, Linkoping university hospital, in which 30 consecutive patients with various anorectal disorders consented to ambulatory (No=29) or hospitalized (No.=1) operations with perineal block noted that the perineal block is easy to apply, tolerable and effective as a sole method of anesthesia to anorectal operations [27].

The usage of a mixture containing a short-term local anesthesia (lignocain) combined with a long-term local agent (bupivacain) with adrenaline allows for the patients immediate discharge at the end of surgery. In addition to that, the use of home care program that include a high residue diet, topical and general analgesic and frequent warm sitz bath make for an easy postoperative course. Lastly close follow up by a surgeon contributes to the success of operation and to the patient's confidence [28].

Local anesthesia is suitable mode of anesthesia for various anal operations that a surgeon can carry out by his own. It has high degree of acceptance, tolerance and satisfaction among patients. The technique is simple, safe, efficient and with low pain score and complications. We believed that local anesthesia is the preferred choice of anesthesia for most anal diseases because it is economical, without post anesthesia side effects, has better pain control in the postoperative period and faster return to full social activities.

## References

1-Celoria G. Local anesthesia in anal surgery. *Minerva Chir* 1993; 48: 1103-1106.

2-Marti MC. Loco-regional anesthesia in proctological surgery. *Ann Chir* 1993; 47: 250-255.

3-Smith L E. Ambulatory surgery for anorectal disease: An up-date. *South Med J* 1986;79(2): 63-6.

4-Fleisher M, Marini CP, Statma R, Capella J, Shevele K. Local anesthesia for anorectal surgical procedures. *Am Surg*. 1994; 60(11):812-5.

5-Read TE, Henry SE, Hovis RM, Fleshman JW, Binbaum EH, Caushaj PF, Kodner IJ. Prospective evaluation of anesthetic technique for anorectal surgery. *Dis Colon Rectum* 2002; 42(11): 1553-1558.

6-Griffin JF. Anesthesia for ambulatory anorectal surgery. Current surgical therapy. Philadelphia: BC Doctor Inc, 1989.

7-Smith L E. Ambulatory surgery for anorectal disease: an update. *South Med J* 1986; 79: 163-166.

8-Medwell SJ, Friend WG. Outpatient anorectal surgery. *Dis Colon Rectum* 1999; 22:480-482.

9-Salvati EP, Kratzar GL. Advantages of local over spinal anesthesia in anorectal surgery. *Surg Gynecol Obstet* 1986;103:434-436.

10-Kratzer GL. Local anesthesia in anorectal surgery. *Dis Colon Rectum* 1985; 8:441-445.

11-Foo E, Sim R, Lim HY, Chan SI. Ambulatory anorectal surgery. Is it feasible locally? *Ann Acad Med. Singapore* 1998; 27: 512-514.

12-Nivatvonges S. Technique of local anesthesia for anorectal surgery [Letter]. *Dis Colon Rectum* 1999;40: 1128-1129.

13-Gabrielli F, Goiffi U, Chiarelli M, Guttadaura A, De Simone M. Haemorrhoidectomy with posterior perineal block: experience with 400 cases. *Dis Colon Rectum* 2000; 43: 809-812.

14-Nystrom PO, Derwinger K, Gerjy R. Local perianal block for anal surgery. *Tech Coloproctol* 2004; 3: 823-6.

- 15-Delikoukos S ,Zacharoulis D, Hatzitheofilou C. Local posterior perianal block for proctologic surgery .Int Surg2006; 91: 348-51.
- 16-Wahlgren CF, Quiding H.Depth of cutaneous analgesia after application of aeutectic mixture of local anesthetic lidocain and prilocain(EMLA cream) J Am Acad Dermatol 2000;42:584-8.
- 17-Ho KS, Eu KW, Heah SM, Seowchoen F, Chan YW Randomized clinical trial of haemorrhoidectomy under a mixture of local anesthesia versus general anesthesia. Br j Surg2000; 87: 410-13.
- 18-Potchavit A. Perianal block for ambulatory haemorrhoidectomy, an easy technique for general surgeon. J Med Assoc Thai 2009; 92(2): 195-197
- 19-Scrafone WL, Tung HM, Chu KW, Lee FC. Ambulatory stapled haemorrhoidectomy:a safe and feasible surgical technique.Hong Kong Medical Journal.2003; 9: 103-107.
- 20-Lohsiriwat L, Lohsiriwat D. Ambulatory anorectal surgery under perineal anesthetic infiltration; analysis of 222 cases. J Med Assoc Thai 2007; 90(2): 278-281.
- 21-Arndt KA, Burtan C, Noe JM. Minimizing the pain of local anesthesia. Plast Reconstr Surg. 1983; 72: 1164-9.
- 22-Gerjy R, Lindhoff-Larson A, Sjobahl R, Nystrom PO. Randomized clinical trial of stapled haemorrhoidectomy performed under local perianal block versus general anesthesia. Br J Surg 2008; 95:1344-51
- 23-Lacerda-Filho A, Cunha-Melo JR. Outpatient haemorrhoidectomy under local anesthesia. Eur J 1997; 163: 935-940
- 24-Gupta PJ. Ambulatory proctology surgery-an Indian experience. Eur Rev Med Pharmacol Sci 2006 Sep-Oct; 10(5): 257-62.
- 25-Celoria G, Falco E, Nardini A, Gianardi M, Poltti G, Di Alrsio L. Local anesthesia in anal surgery. Technical notes and immediate results. Minerva Chir 1993 Oct 15; 98(19): 1103-6.
- 26-Kim J, Lee DS, Jang SM, Shim MC, Jee DL. The effect of pudendal block on voiding after haemorrhoidectomy. Disease of colon and rectum. 2005; 48: 518-523.
- 27-Vinson-Bonnet B, Coltat JC, Fingerhut A, Bonnet F. Local infiltration with ropivacain improve immediate post operative pain control after haemorrhoid surgery. Disease of Colon and Rectum 2002; 45: 104-108.
- 28-Esser S, Khubchardani I, Rokhmanine .Stapled haemorrhoidectomy with local anesthesia can be performed safely and cost efficiently. Dis Colon Rectum 2004; 47:1164-9.