
Evaluation and Comparison the Efficacy of Bupivacaine Socked Spongostan and Bupivacaine Infiltration in Relieving Post Episiotomy Pain

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Back ground: The perineal pain resulting from episiotomy is a stressful factor in mothers, which interferes with their ability of nursing and doing their duties as a mother and may interfere with urination and defecation.

Aim of the study: To evaluate and compare the efficacy of adding spongostan soaked with bupivacaine at episiotomy bed, or 0.5% bupivacaine infiltrated alone with 1% of lidocaine (served as control) in relieving post episiotomy pain.

Patients and method: A prospective comparative study was conducted at department of obstetrics and gynecology in Baghdad teaching hospital during the period of the first of January 2010 till the end of December 2010.

During the period of the study a 150 women had vaginal deliveries with mediolateral episiotomy and met the inclusion criteria after obtaining informed consent were recruited in the study and enrolled into 3 groups assigned as first group including 50 women receiving only 1% lidocaine locally infiltrated at episiotomy site served as control group, second group including 50 women receiving in addition to the local 1% lidocaine a 0.5% bupivacaine infiltrated at episiotomy site at the end of the reconstruction of their episiotomy, finally the third group including 50 women receiving 1% lidocaine infiltration at episiotomy site but prior to repair, an absorbable gelatin sponge (spongostan) soaked with 0.5% bupivacaine placed in the episiotomy bed without suturing matched with the length of episiotomy then continued the suturing procedure.

Results: In visual analog scale (VAS) At 0 hour, the pain score for the spongostan group (1.98 ± 0.95) was significantly more than the score of Bupivacaine group (1.54 ± 0.73) the P value < 0.05 but significantly less than the lidocaine group (5.72 ± 0.88) P value < 0.05 . Then the pain scores at 1, 1.5, 2, 6, and 24 hour for the spongostan group (0.66 ± 0.62 , 0.24 ± 0.43 , 0.18 ± 0.38 , 0.46 ± 0.54 , 0.86 ± 0.35 respectively) were significantly lower than the bupivacaine group (1.04 ± 0.57 , 0.64 ± 0.48 , 0.56 ± 0.50 , 2.18 ± 0.48 , 3.16 ± 0.79) P value < 0.05 and the lidocaine group (3.54 ± 0.81 , 3.10 ± 0.81 , 3.54 ± 0.61 , 3.44 ± 0.64 , 2.42 ± 0.53) the P value < 0.05 . Also the pain scores for the bupivacaine group at 1, 1.5, 2, 6, and 24 hour were significantly lower (1.04 ± 0.57 , 0.64 ± 0.48 , 0.56 ± 0.50 , 2.18 ± 0.48 , 3.16 ± 0.79) than the pain scores of lidocaine group (3.54 ± 0.81 , 3.10 ± 0.81 , 3.54 ± 0.61 , 3.44 ± 0.64 , 2.42 ± 0.53) the P value < 0.05 . The analgesia requirement time for spongostan group (0.00) was significantly less than the bupivacaine (10.06 ± 2.37) and the lidocaine groups (1.80 ± 0.86) P value < 0.05 . Also The analgesia requirement time for the bupivacaine group (10.06 ± 2.37) was significantly less than the lidocaine group (1.80 ± 0.86) P value < 0.05 . The analgesic doses required per 24 hour for the spongostan group (0.00) was significantly less than the Bupivacaine (1.00 ± 0.00) and the lidocaine groups (1.98 ± 0.318) the P value < 0.05 . As well as the bupivacaine group (1.00 ± 0.00), showed a significantly less analgesic doses than the lidocaine group (1.98 ± 0.318) P value < 0.05 .

Conclusions:

1. The addition of 0.5% bupivacaine at episiotomy site had significantly less pain score and analgesic requirement than infiltration of 0.1% of lidocaine alone
2. But the adding of spongostan soaked with bupivacaine at episiotomy bed is more superior in pain relieve than bupivacaine or lidocaine alone

Key words: episiotomy, spongostan, bupivacaine

Introduction:

Episiotomy is a surgical incision of the perineum made to increase the diameter of the vulval outlet⁽¹⁾. Although still a common obstetrical procedure⁽²⁾ introduced more than 200 years earlier, obstetricians only came to favor episiotomy at the beginning of the twentieth century.

It was then thought that all primigravidae should receive an episiotomy to protect the fetal head and the pelvic floor. Further research carried out over the last 20 years has shown the problems associated with the procedure, which include unsatisfactory anatomical results increased blood loss, perineal pain and dyspareunia. Pain management is an important part of modern obstetric care and the obstetrician should appreciate the importance of providing pain relief during labour through the use of nonpharmacologic techniques, systemic analgesics, or regional block analgesia. During the second stage of labour, additional analgesia may also be needed through perineal extension of a

segmental epidural, spinal analgesia, or through the use of pudendal or local infiltration⁽³⁾

Patients and method

This comparative prospective study was conducted at department of obstetrics and gynecology of Baghdad teaching hospital during the period from first of January 2010 till the end of December 2010. (The women who had delivered vaginally with mediolateral episiotomy were involved in the study after obtaining informed consent). In our hospital, during the second stage of labor as the woman in lithotomy position and the presenting part has begun to distend the perineum, under aseptic technique, infiltration of episiotomy site (mediolateral) with (10 ml) 1% lidocaine, (without adrenalin) Large, sharp, straight scissors is the instrument of choice. It is used to make a single incision about 3-6 cm depending on the size of the perineum. The depth involves the superficial perineal muscles like a second degree tear, reconstruction of episiotomy was done after delivery

of the placenta by a synthetic absorbable material. Re-approximation of the perineal skin edges is most frequently obtained by use of a subcuticular stitch, usually beginning inferiorly and proceeding upward toward the fourchette. .

Research plan: The patients were allocated randomly into three groups:

Group 1: including (50) patients episiotomy were done for them after infiltration with 10 ml of 1% lidocaine, episiotomy repaired as mentioned above, post reconstruction analgesia was available on demand which was either diclofenac or tramadol.

Group 2: including (50) patients episiotomy were done for them after infiltration with 10ml of 1% lidocaine, when the presenting part distend the perineum, but during the reconstruction procedure we re-infiltrate the episiotomy site (vaginal and perineal) after careful aspiration with (10 ml) of 0.5% bupivacaine. Analgesia is available on demand.

Group 3: including (50) patients receiving episiotomy after infiltration with 10 ml of 1% lidocaine. after delivery of fetus and placenta and prior to episiotomy repair absorbable gelatin spong {spongostan, B\Braun(Lyostypt)_R, Germany} soaked with 0.5% bupivacaine placed in the episiotomy bed without suturing The dose of bupivacaine and the length of spongostan were matched with the length of episiotomy, 1 ml of bupivacaine (5mg/ml) was absorbed for each centimeter of spongostan and reconstruction of episiotomy continue in the same manner as mentioned above. Analgesia is given on demand. All patients in three groups received routine post partum perineal care with observation in the post natal ward for the vital signs, post partum hemorrhage while maintaining verbal contact with the patient, severity of pain post repair rated on a (10cm) visual analog scale VAS 0(no pain) to 10 (worst pain), rating was recorded at 0, 1, 1.5, 2, 6, and 24hrs.

The pain was prescribed by the patient and each patient was asked to mark the point that best indicated the perception of her pain on the visual analog scale, 0(no pain) 1-3(mild) 3- 6 (moderate) 6-

9 (severe) and 10 (agonizing pain) this was done by single investigator. The time lapse for demand of analgesia was recorded, since the last stitch of the episiotomy repair till the first dose of analgesia requested by hours and described as (analgesia requirement time).

Also the amount of the required analgesia was recorded as total analgesic dose/ patient during 24 hours. Patients were followed up with respect to episiotomy complications such as hematoma, infection, and wound dehiscence during the next 4 weeks (by telephone) and had been examined as the situation demand.

Exclusion criteria:- Those with extension of episiotomy or labial, periurethral, vaginal wall lacerations.

- Delivery under epidural anesthesia.
- Patients need forceps or vacuum application during delivery.
- Patients with post partum hemorrhage either due to episiotomy or other major post partum complications.
- Patients with history of adverse reaction to local anesthetic drugs.

Statistical analysis Statistical analyses were conducted using Statistical Package for Social Sciences (SPSS), ANOVA (Analysis of Variance) and LSD (Least Significant Difference). Data were collected and described by mean $\pm$ standard deviation, P value less than 0.05 was considered significant

Results

Table 1: show the demographic and obstetric characteristics of the three groups: the maternal age, parity, gestational age (weeks), maternal weight (kg) and birth weight (kg) there were no significant differences in demographic and obstetric characteristics among the lidocaine, bupivacaine and spongostan groups in: maternal age (22.98 $\pm$ 3.62, 23.10 $\pm$ 3.96, 22.86 $\pm$ 5.69), parity (0.10 $\pm$ 0.030, 0.06 $\pm$ 0.23, 0.06 $\pm$ 0.23) gestational age (39.26 $\pm$ 0.94, 39.48 $\pm$ 2.43, 39.52 $\pm$ 1.03) maternal weight (71.02 $\pm$ 5.23, 72.00 $\pm$ 6.41, 72.68 $\pm$ 6.88), and the birth weight (2.9400 $\pm$ 0.36, 2.79 $\pm$ 0.38, 3.05 $\pm$ 0.30) respectively. The (p value > 0.05)

Table 1: Demographic and obstetric characteristics of groups

	lidocaine	Bupivacaine	Spongostan	P value
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
Age (years)	22.98 $\pm$ 3.62	23.10 $\pm$ 3.96	22.86 $\pm$ 5.69	>0.05
Parity	0.10 $\pm$ 0.030	0.06 $\pm$ 0.23	0.06 $\pm$ 0.23	
G.age (weeks)	39.26 $\pm$ 0.94	39.48 $\pm$ 2.43	39.52 $\pm$ 1.03	
M .Wt (Kg)	71.02 $\pm$ 5.23	72.00 $\pm$ 6.41	72.68 $\pm$ 6.88	
B . Wt (Kg)	2.9400 $\pm$ 0.36	2.79 $\pm$ 0.38	3.05 $\pm$ 0.30	

SD: standard deviation, G.age: gestational age, M.wt: maternal weight, B.Wt: birth weight

Table 2 show the measurements of the episiotomy including the length (vaginal and Perineal) in centimeters, depth measured in centimeters and the duration of the reconstruction time (repair of episiotomy) calculated in minutes.

The results showed a significant differences in the length and depth of episiotomy in both the lidocaine and the Bupivacaine groups (length 5.30 ± 0.73 , 5.24 ± 0.77 , depth: 3.15 ± 0.49 , 3.10 ± 0.51) from the spongostan group (length 4.60 ± 0.86 , depth: 2.82 ± 0.39)

P value (<0.05).also we found a difference in the reconstruction time between the three groups being longer in lidocaine group (16.52 ± 1.96), than the bupivacaine (15.72 ± 2.05), and Spongostan (15.08 ± 2.39) groups P value (<0.05). we thought this differences may be due to the differences in the size of perineum of the recruited women and their cooperation during the reconstruction procedure since all the women had been sutured by the same person.

Table2: Episiotomy measurements (vaginal and perineal)

	Lidocaine	Bupivacaine	Spongostan	P value
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
Epi.Lng Vag(cm)	5.30 ± 0.73	5.24 ± 0.77	4.60 ± 0.86	<0.05
Perineal(cm)	4.96 ± 0.40	4.88 ± 0.58	4.60 ± 0.86	
Epi. Depth(cm)	3.15 ± 0.49	3.10 ± 0.51	2.82 ± 0.39	
Ep.Recons(min)	16.52 ± 1.96	15.72 ± 2.05	15.08 ± 2.39	

SD: standard deviation; Epi.Lng vag: episiotomy length of vagina;Ep: episiotomy;Recons: reconstruction time

Table 3 show the pain score of the three comparative groups scored on a 10 cm Visual analog scale at (0, 1, 1.5, 2, 6, and 24 hours)respectively.

In VAS At 0 hour which is recorded immediately after the repair of the Episiotomy, the pain score for the spongostan group(1.98 ± 0.95) was significantly more than the score of Bupivacaine group (1.54 ± 0.73) the P value <0.05 but significantly less than the lidocaine group (5.72 ± 0.88) P value <0.05 .

Then the pain scores at 1, 1.5, 2, 6,and 24 hour for the spongostan group (0.66 ± 0.62 , 0.24 ± 0.43 ,

0.18 ± 0.38 , 0.46 ± 0.54 , 0.86 ± 0.35 respectively) were significantly lower than the bupivacaine group(1.04 ± 0.57 , 0.64 ± 0.48 , 0.56 ± 0.50 , 2.18 ± 0.48 , 3.16 ± 0.79) P value <0.05 and the lidocaine group (3.54 ± 0.81 , 3.10 ± 0.81 , 3.54 ± 0.61 , 3.44 ± 0.64 , 2.42 ± 0.53) the P value <0.05 .

Also the pain scores for the bupivacaine group at 1, 1.5, 2, 6, and 24 hour were significantly lower(1.04 ± 0.57 , 0.64 ± 0.48 , 0.56 ± 0.50 , 2.18 ± 0.48 , 3.16 ± 0.79) than the pain scores of lidocaine group(3.54 ± 0.81 , 3.10 ± 0.81 , 3.54 ± 0.61 , 3.44 ± 0.64 , 2.42 ± 0.53) the P value <0.05 .

Table3: Pain score for the three groups

	lidocaine	Bupivacaine	Spongostan	P value
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
VAS0hr	5.72 ± 0.88	1.54 ± 0.73	1.98 ± 0.95	< 0.05
VAS1hr	3.54 ± 0.81	1.04 ± 0.57	0.66 ± 0.62	
VAS1.5hr	3.10 ± 0.81	0.64 ± 0.48	0.24 ± 0.43	
VAS2hr	3.54 ± 0.61	0.56 ± 0.50	0.18 ± 0.38	
VAS6hr	3.44 ± 0.64	2.18 ± 0.48	0.46 ± 0.54	
VAS24hr	2.42 ± 0.53	3.16 ± 0.79	0.86 ± 0.35	

SD: standard deviation; VAS: visual analog scale, hr: hour

Table 4 show the analgesia requirement time since the last stitch of episiotomy

Till the first dose of analgesia requested (hours) and the number of doses of analgesia required per 24 hours for each patient.

The analgesia requirement time for spongostan group (0.00) was significantly less than the bupivacaine (10.06 ± 2.37) and the lidocaine groups (1.80 ± 0.86) P value <0.05 . Also The analgesia requirement time for the bupivacaine group

(10.06 ± 2.37) was significantly less than the lidocaine group (1.80 ± 0.86).P value < 0.05

The analgesic doses required per 24 hour for the spongostan group (0.00) was significantly less than the Bupivacaine (1.00 ± 0.00) and the lidocaine groups (1.98 ± 0.318) the P value <0.05 As well as the bupivacaine group (1.00 ± 0.00) showed a significantly less analgesic doses than the lidocaine group (1.98 ± 0.318) P value <0.05

Table 4: Analgesia requirement time and analgesia doses

	Lidocaine	Bupivacaine	Spongostan	P value
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
Analg.Req (hrs)	1.80 $\pm$ 0.86	10.06 $\pm$ 2.37	0.00	<0.05
Analg.Dose(no.)	1.98 $\pm$.318	1.00 $\pm$ 0.00	0.00	

SD: standard deviation, Analg. Req: analgesic requirement; Analg : Analgesic Dose

Table 5: the infection number and percentage for the three groups

		Type			Total	P value
Epi .infec		Spongostan	Bupivacaine	lidocaine		
	No infection	49	48	48	145	>0.05
		33.8%	33.1%	33.1%	100.0%	
	Infection	1	2	2	5	
		20.0%	40.0%	40.0%	100.0%	
Total		50	50	50	150	
		33.3%	33.3%	33.3%	100.0%	

Epi. Infec: episiotomy infection,

In **table 5** there was no significant differences in the number of women with infected episiotomy between the three: the lidocaine (2), bupivacaine (2) and spongostan (1) groups, the P value >0.05

Discussion

perineum is a very sensitive area, in which there are muscles involved in sitting, walking, bending down, squatting, urination and defecation.⁽⁴⁾

Any incision in this area cause pain and disorder which has mental, social and physical effects on women. So the perineal pain resulting from episiotomy is a stressful factor in mothers, which interferes with their ability of nursing and doing their duties as a mother and may interfere with urination and defecation. When making decisions on the choice of pain killers for post episiotomy pain, we see that traditional regimens of oral analgesic agents have limitations in that they are often prescribed after the pain has started, and this mean a further delay between patients requesting and receiving analgesia.⁽⁴⁾ Sanders et al at—year reported that pain of sutures of perineum was described as “distressing” “horrible” or “excruciating” by 16.5% of women after vaginal delivery.⁽⁵⁾

Other parenteral analgesic drug like Diclofenac, one of the NSAID, is used for pain control in many surgeries but with side effects like stomach pain, gastrointestinal discomfort, nausea, diarrhoea, headache, vertigo, dizziness, drowsiness, insomnia, and rash.⁽⁶⁾

The use of narcotic analgesics has yet to be proven as a better pain –reliever for this acute perineal pain⁽⁷⁾ the mostly used parenteral narcotic is tramadol hydrochloride, its mode of action not fully understood, but it is believed to work through modulation of the noradrenergic and serotonergic systems in addition to its mild agonism of the μ -opioid receptor. It has a reported adverse drug reactions most commonly are nausea, vomiting,

sweating, and constipation. Drowsiness is also reported, Respiratory depression, a common side effect of most opioids but not in normal doses⁽⁸⁾.

these side effects made a limitation in the uses of systemic analgesia and the works and efforts switch towards the use of local anesthesia.

In our study we try to see the effect of local anesthesia on pain control and the difference between the type and the way of introducing these drugs as post episiotomy pain killer, there were no significant differences in demographic and obstetric characteristics among the three groups, but a significant differences in the length and depth of episiotomy in both the lidocaine and the Bupivacaine groups (being longer in these groups, from the spongostan group also we found a difference in the reconstruction time between the three groups being longer in lidocaine group, than the bupivacaine, and Spongostan groups P value (<0.05). we thought this differences may be due to the differences in the size of perineum of the recruited women and their cooperation during the reconstruction procedure since all the women had been sutured by the same person.

The pain score of the three comparative groups was scored on a 10 cm Visual analog scale (VAS) at (0, 1, 1.5, 2, 6, and 24 hours) respectively with verbal contact.

In VAS At 0 hour which is recorded during and immediately after the repair of the Episiotomy, The pain score in both the spongostan and the Bupivacaine groups (1.98 $\pm$ 0.95, 1.54 $\pm$ 0.73) respectively was significantly lower than the lidocaine group (5.72 $\pm$ 0.88) P value <0.05. The explanation for that, the control group were infiltrated by 1% lidocaine only prior to episiotomy

cut, since it acts rapidly with short duration⁽⁹⁾ this time had been consumed by the delivery of the fetus till the reconstruction of the episiotomy so they had a higher pain score at 0 hour. the local anesthetic agent modulate peripheral pain transduction by inhibiting the transmission of noxious impulses from the site of injury⁽⁶⁾

The bupivacaine which is a long acting anesthesia had rapid onset of action but with longer duration⁽⁹⁾ when injected immediately after the reconstruction had a lower pain score than spogostan group, its rapid availability at the site of scar responsible for its superiority.

Also the pain scores for the bupivacaine group at 1, 1.5, 2, 6, and 24 hour were significantly lower than the pain scores of lidocaine group, the P value<0.05. this can be explain as follow: the Bupivacaine has a longer duration of action than lidocaine, approx. 6-8 hours as opposed to 1-2 hours for lidocaine⁽⁹⁾ The onset of action with Bupivacaine is rapid and anesthesia is long-lasting. The duration of anesthesia is significantly longer with Bupivacaine than with any other commonly used local anesthetic. It has also been noted that there is a period of analgesia that persists after the return of sensation, during which time the need for strong analgesics is reduced⁽¹⁰⁾

Mohammed I. Akhtar et al 2009 show that wound infiltration with bupivacaine 0.25% was better for pain relief in comparison with ketorolac regarding percentage pain relief ,onset and duration of action⁽¹¹⁾ Azin Alavi et al 2007 find that bupivacaine wound infusion was a simple and safe technique that provides effective analgesia and reduces morphine requirement after cesarean delivery⁽¹²⁾ While D. Churchill et al 1995 failed to show any benefit from infiltration of episiotomy wounds with bupivacaine and adrenaline as distinct from saline alone⁽¹³⁾

The gelatin sponge was mainly used to arrest bleeding by the formation of an artificial clot and by producing a mechanical matrix that facilitates clotting⁽¹⁴⁾ The spongy physical properties of the gelatin sponge hasten clot formation and provide structural support for the forming clot. In addition to its hemostatic effect, Spongostan may be used as a drug reservoir, and may provide sustained release of some drugs^(15,16) We soaked the Spongostan with a 0.5 % bupovacain and placed at episiotomy bed, it showed a significant less pain score at 1 hour with prolongation of its action for up to 24 hours than the control and the bupovacain groups. We thought that the slow release of the drug from its granules is responsible for its delay but prolong action duration.

Hasan Kafali et al 2008 find that placement of bupivacaine soaked spongostan into the episiotomy bed resulted in decreased postpartum pain and drug requirement.

It may be attributed to a higher drug concentration at episiotomy bed and prolonged drug

effect⁽¹⁷⁾. Verma et al 2006 find that visceral pain is prominent after laparoscopic cholecystectomy and can be effectively controlled by 0.5% bupivacaine soaked surgical in the gallbladder bed alone. Trocar site infiltration alone is ineffective⁽¹⁸⁾.

The mucous permeability and dense network of blood vessels has made vagina an excellent route of drug delivery for both local and systemic effect^(19,20), they thought that the permeation mechanism for most of the active substances of drugs are follows mainly diffusion. Whereas majority hydrophobic substances are mainly absorbed through intracellular route, while hydrophilic one are preferably absorbed by pores present in the vaginal mucosa⁽²¹⁾. Anita Shukla et al have demonstrated that the application of a vancomycin releasing multilayer film to a highly absorbent and porous gelatin sponge substrate has a tremendous impact on increasing vancomycin loading and also extending release times compared to a flat substrate.

Additionally, we have enhanced the therapeutic properties of a commercial gelatin sponge, rendering it antimicrobial while increasing its absorption capabilities. In a similar fashion, multiple substrates such as sutures, bandages, and nanofiber matrices can be coated with therapeutics rapidly and effectively to generate sustained drug release biomedical coatings⁽²²⁾ same result in our study.

In our study, the analgesia requirement time for spongostan group was significantly less than the bupivacaine and the lidocaine groups, Pvalue<0.05. Also The analgesia requirement time for the bupivacaine group was significantly less than the lidocaine group P value < 0.05.

S. Fyनेface-organ et al 2006 compare two local anesthetic agents on postpartum perineal pain in primiparous women and conclude that the patients in the bupivacaine group had a prolonged analgesia and needed fewer doses of oral analgesics in the immediate postpartum perineal repair period⁽²³⁾. There was no significant differences in the number of women with infected episiotomy between the three groups: the lidocaine (2), bupivacaine (2) and spongostan (1) groups, the P value >0.05

References

1. Philip N Baker, operative intervention in obstetrics, Philip N Baker, Louis C Kenny, Obstetrics by Ten Teachers 19 th edition, London, Hodder & Stoughton: 2011, p224-225
2. F. Gary Cunningham, Kenneth J. Leveno, Steven L. Bloom, John C. Hauth et al: chapter 17 (normal labour & delivery) Williams obstetrics, 23th edition McGraw-Hill, United States 2010, p401
3. Joy L. Hawkins, Obstetric Analgesia and Anesthesia, Gibbs, Ronald S.; Karlan, Ingrid E. Nygaard: Danforth's Obstetrics and Gynecology, 10th Edition, Lippincott Williams & Wilkins Aurora, Colorado, 2008: p34-45

4. W.C. Yoong , F. Biervliet and R. Nagrani The prophylactic use of diclofenac(voltarol)suppositories in perineal pain after episiotomy. A random allocation double –blind study. J.of obs&gynecol 1997;17(1):39-41
5. Franchi M,Cromi A, Scarperi S, Gaudion F, Siesto G, Ghezzi F: comparison between lidocaine-prilocaine cream(EMLA) and mepivacaine infiltration for pain relief during perineal repair after child birth: a randomized trial. Am Obstet Gynecol 2009;201(186): 1-5
6. Fabio Fascinate et al.: Diclofenac pyrrolidine versus ketoprofen for the relief of pain from episiotomy :a randomized controlled trial Acta Obstet Gynecol Scand 2005 ;48:951-955
7. Peter EA, Janseen PA, Grange CS, Douglas MJ, Ibuprofen versus acetaminophen with codeine for the relief of perineal pain after child birth :a randomized controlled trial. Can Med J 2001;1(165): 203-9
8. Surakarn J, Tannirandorn Y. Intramuscular :diclofenac for analgesia after cesarean delivery :a randomized controlled trial: J Med Assoc Thai 2009 ;92 (6):733-8
9. .Dvickers M.,Morgan M, P. S. J. Spenser, M. S. Read :Drugs in anesthesia and intensive care practice. 3rd edition , London 1999,p 204-212
10. Boogaerts J, Declercq A, Lafont N, Benameur H, Akodad EM, Dupont JC, Legros FJ: toxicity of Bupivacaine encapsulated into liposomes and injected intravenously: comparison with plain solutions. Anesthesia and analgesia , 1993 Mar, 76(3):553-5 [www.drexelmed.edu/ Home/.../Bupivacaine Mercaine use.aspx](http://www.drexelmed.edu/Home/.../Bupivacaine%20Mercaine%20use.aspx)
11. . mohammed irfan akhtar, mohammed saleem , jawad zaheer, wound infiltration with bupivacaine versus ketorolac for postoperative pain relieve in minor to moderate surgeries, J Pak Med Assoc 2009 :59 (6):385-438
12. Azin Alavi, Saghar Salehpour, Mahnaz Narimani: The efficacy of postoperative wound infusion with bupivacaine for pain control after cesarean delivery:Randomized double blind clinical trial, 2007, 1(2): 59-64
13. . D.Churchill, E. J. Buxton, M. Mann ,D.M. Luesley: Bupivacaine with adrenaline infiltration following episiotomy repair , J of Obst &Gynecol 199; 15(1): 29-30
14. Guralnick W,Berg L: Gelfoam in oral surgery .www.exmed.com/b2.../Gelfom.html
15. Ragusa R, Faggian G , Rungatscher A, Cugola D, Marcon A, Mazzucco A: Use of gelatin powder added to rifamycin versus bone wax in sternal wound hemostasis after cardiac surgery. Interact Cardiovasc.Thorac Surg. 2007;6: 52–55.
16. Ferroli P, Broggi M, Franzini A : Surgifoam and mitoxantrone in the glioblastoma multiforme postresection cavity: the first step of locoregional chemotherapy through an ad hoc-placed catheter; technical note. Neurosurgery. 2006;59: 433–434.
17. . Hasan Kafali, Canadian Iltemur Duvan, Elif Gozdemir , Serap Simavli, Nilgum Ozturk Turhan: Placement of Bupivacaine-soaked Spongostan in Episiotomy Bed Is Effective Treatment Modality for Episiotomy-associated Pain: J. of Minimally Invasive Gynecology,2008 ;15(6):719-22.
18. Verma GR, Lyngdoh TS, Kaman L. Bala I., Placement of 0.5% bupivacaine-soaked Surgicel in the gallbladder bed is effective for pain after laparoscopic cholecystectomy.J surg endo, 2006: 20(10):1560-4. Available from www.ncbi.nlm.nih.gov
19. Weber J., Desai K. & Darbyshire J.: The development of vaginal microbicides for the prevention of HIV transmission, PLOS Medicine. 2005, 2: 392-95.
20. Katz D.F., Dunmire E. N., Henderson M. H., Owen D.H. & Plenys A.M., Applications of biomedical engineering in reproductive biomedicine: Sensing and drug delivery to the lower female reproductive tract, Eng. Med. Boil. Soc., 1997, 30: 2656-58.
21. Ananta Choudhury, Sujoy Das, and Mousumi Kar : A Review on Novelty and Potentiality of vaginal drug delivery: International Journal of PharmTech Research , 2011, 3(2): 1033-1044
22. Shukla A, Fang JC, Puranam S, Hammond PT: Release of vancomycin from multilayer coated absorbent gelatin sponges, J.control release 2012;157(1):64-1.
23. Fyneyface-organ S, Mato CN., Enyindah, C. E.: postpartum perineal pain in primiparous women: a comparison of two local anesthetic agents, Nigerian J. of Medicine 2006 ;15(1):77-80

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