

Thoracic epidurally administered bupivacaine affects urethral sphincter tonus in women after open renal surgery

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Hypothesis and aims:

It is unclear if epidurally administered opioids influence urethral sphincter tonus, whereas it is well known that systemic administration of opioids does.

The objective of this study was to determine which epidurally administered drugs or drug mixtures affect urethral sphincter tonus in women undergoing open renal surgery.

Study design, material and methods:

Design: pooled analysis of an open observational and a double blinded randomized study; single center trial

Setting: Department of Urology, University Hospital Bern, Switzerland

Participants: 28 women with no pre-existing lower urinary tract symptoms who underwent open renal surgery and with thoracic epidural analgesia (TEA) were pooled in three groups with different epidural regimes (7 with bupivacaine 0.125%, 8 with bupivacaine 0.125% and fentanyl 2µg/ml and 13 with bupivacaine 0.1% plus fentanyl 2µg/ml and epinephrine 2µg/ml). Inclusion criteria were IPSS ≤ 7 and postvoid residual < 100mL. Exclusion criteria was the postoperative use of systemic opioids.

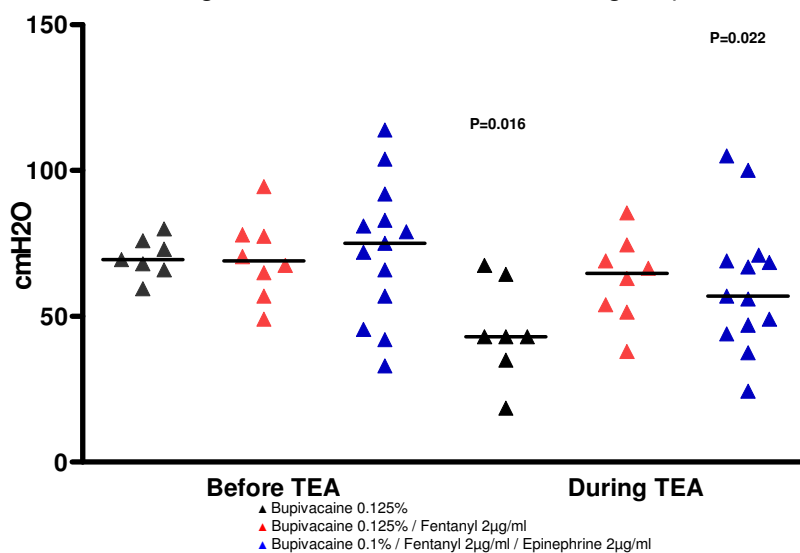
Interventions: All women underwent urethral pressure measurements before TEA and during TEA 2-3 days postoperatively. All women received a TEA at the insertion site interspace T8/9. All urodynamic parameters were assessed according to the guidelines of the International Continence Society.

Results:

Baseline characteristics: Data are presented as median values [range].

	Bupivacaine Group (n=7)	Bupivacaine /Fentanyl Group (n=8)	Bupivacaine/Fentanyl/ Epinephrine Group (n=13)	P-Value
Age (yrs)	61 [43, 85]	63 [42, 75]	65 [39, 79]	0.396
ASA Classification (II/III)	3/4	3/5	8/6	0.485
IPSS	3 [0, 6]	2 [0, 7]	4 [0, 7]	0.273
Epidural mixture rate postoperatively (ml/h)	8.0 [4, 12]	8.0 [4, 12]	7.0 [5, 12]	0.324
NRS at rest	0 [0, 2]	0 [0, 1]	0 [0, 2]	0.551
NRS during mobilization	2 [0, 5]	2 [0, 4]	2 [0, 5]	0.102
Segmental blockade during TEA				
Upper thoracic dermatome	4 [3, 5]	5 [4, 6]	4 [4, 6]	0.166
Lower thoracic dermatome	12 [11, 12]	11 [10, 12]	12 [10, 12]	0.036*

Scatter plot of the urethral pressure profile at rest of the three groups (within patients P value<0.05 as significant between before TEA vs during TEA):



Maximum urethral pressure at rest decreased significantly during TEA with bupivacaine alone (median 70cm H₂O (range: 60-80) to 43 (19-68), P=0.031) and with bupivacaine/fentanyl/epinephrine (75cm H₂O (range 33-115) to 56 (24 -105), P=0.028) whereas with bupivacaine/fentanyl no significant change could be detected (74 (49-95) vs 67 (38-86), P=0.156). Functional urethral profile length was not changed in any of the groups during TEA.

Interpretation of results:

TEA with bupivacaine appears to decrease maximum urethral closing pressure in women. The addition of fentanyl seems to counteract this effect.

Conclusions:

TEA affects urethral function. The effect seems to depend on the drug mixture administered.