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Priapism After Epidural or Spinal Anesthesia

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Priapism After Epidural and Spinal Anesthesia

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Introduction

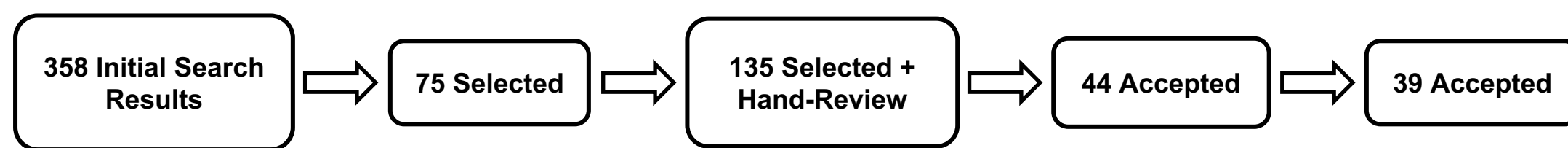
- Preoperative epidural and spinal anesthesia improves patient outcomes by reducing potential side effects of general anesthesia
- Rarely, patients develop priapism secondary to administration of the anesthetic agent
 - This is generally classified as high-flow priapism
- Little is known about the development of this complication
- There is no standardized management following onset

Rationale - A case of priapism following administration of epidural anesthesia in Kalamazoo, MI, at Bronson Methodist Hospital, prompted a search of the literature into the etiology, pathophysiology, and management of such cases

Methods

- Literature search of SCOPUS and PubMed
- Terms included: epidural anesthesia, spinal anesthesia, priapism, penile erection
- Inclusion criteria:
 - Case reports, case series, review papers about erections secondary to regional anesthesia
 - Pathophysiology and treatment of all-cause priapism
 - Physiology of innervation to the penis

Figure 1: Flowchart of studies included in review



Results

Author	Country	Procedure	Incidence Epidural	Incidence Spinal	Total Epidural	Total Spinal
Staerman ¹	France	Endoscopic	3 (3.85%)	1 (0.29%)	78	344
Guler ²	Turkey	Transurethral	1 (1.72%)	8 (0.12%)	58	6872
Rao ³	India	Transurethral	3 (0.17%)	N/A	1800	N/A
Baltogiannis ⁴	Greece	Transurethral	3 (0.10%)	N/A	2867	N/A

Table 1: Reported incidence of priapism

Results

- Overall incidence of priapism in US is 0.2-0.3 cases/100,000
- Local anesthetics and opioids implicated as etiologic agents
- Selective inhibition of sympathetic innervation to the penis by anesthetic agents leads to unopposed parasympathetic innervation and subsequent erection
- Management depends on timing of erection onset
 - Withdrawal of inciting agent and pursuit of alternative analgesia
 - Intracavernous injection of α 1-selective sympathomimetic agent
- Outcomes are generally unremarkable

Author	Patient Age	Initial Procedure	Anesthesia Technique	Agent	Level	Onset of Erection	Treatment	Outcome
Baltogiannis ⁴	62	TURP	Epidural	Xylocaine	L4-L5	Within min	Phenylephrine	No AO
Baltogiannis ⁴	41	Urethral stricture	Epidural	Bupivacaine with xylocaine	L3-L4	Within min	Phenylephrine	No AO
Brierly ⁵	72	TURP	Spinal	NR	NR	2 min	Lidocaine + epinephrine	No AO
Miyabe ⁶	59	TURP	Spinal	Tetracaine	T6	30 min	Ephedrine	No AO
Rao ³	35	OIU	Epidural	Xylocaine	L4-L5	Immediate	Terbutaline	No AO
Rao ³	35	OIU	Epidural	Xylocaine	L4-L5	Immediate	Terbutaline	No AO
Rao ³	40	Cystoproctoscopy and L. ureterorenoscopy	Epidural	Bupivacaine with lignocaine	L3-L4	Immediate	Glycopyrrolate	NR
Benzon ⁷	68	TURP	Spinal	NR	NR	Within min	Ketamine	Delayed Procedure
Valley ⁸	60	TURB	Epidural	Lidocaine	L3-L4	Within min	Glycopyrrolate	No AO
Shantha ⁹	76	TURP	Spinal	Tetracaine	L3-L4	Pre-urethroscope	Terbutaline	No AO
Shantha ⁹	45	TURP and TURBT	Spinal	Lidocaine	L3-L4	Pre-urethroscope	Terbutaline	No AO
Benzon ⁷	74	TURP	Spinal	NR	NR	Within min	Ketamine	No AO
Ruan ¹⁰	49	Chronic Pain	Epidural	Bupivacaine with morphine	L3-L4	2 hours	Cease epidural	No AO
Jaganathan ¹¹	13	BFD osteotomies	Epidural	Bupivacaine	L2-L3	11.5 hours post insertion	Cease epidural	No AO
Pelavski ¹²	6	Limb-lengthening	Epidural	Bupivacaine	L3-L4	1 hour	Cease epidural	No AO
Sniderman ¹³	41	Chronic pain	Spinal	Bupivacaine	L3-L4	3 hours	NR	No AO
Hishmeh ¹⁴	44	Total hip arthroplasty	Spinal	Morphine with fentanyl	NR	9 hours after cath removal	NR	NR
Baltogiannis ⁴	58	TURP	Epidural	Xylocaine	L3-L4	Within min	Phenylephrine	No AO
Dubey ¹⁵	57	TURP	Spinal	NR	NR	Immediate	Epinephrine	No AO
Natarajan ¹⁶	59	TURP	Spinal	Bupivacaine	L3-L4	5 minutes post insertion	Glycopyrrolate	Delayed Procedure
Fransen van de Putte ¹⁷	45	TA nephrectomy	Epidural	Bupivacaine	T11-T12	Within min	Cease epidural	No AO
Van Arsdalen ¹⁸	60	TURP	Spinal	Tetracaine	L3-L4	After cytoscope insertion	Spinal at L4-L5	Delayed Procedure
Van Arsdalen ¹⁸	63	Cystourethroscope	Spinal	Tetracaine	L3-L4	After cytoscope insertion	Ketamine	Delayed Procedure
Van Arsdalen ¹⁸	55	Cystourethroscopy	Spinal	Tetracaine	L3-L4	After cytoscope insertion	Ketamine	Delayed Procedure

Table 2: Case Reports of Regional Anesthesia-Induced Erection. Abbreviations: TURP, transurethral resection of the prostate; TURB, transurethral resection of the bladder; TURBT, transurethral resection of bladder tumor; L, lumbar vertebra; T, thoracic vertebra; NR, not reported; IV, intravenous; AO, adverse outcome; Pre-urethroscope, before insertion of urethroscope; OIU, optical internal urethrotomy; BFD, bilateral femoral derotation; TA, transabdominal

Discussion

- The incidence of priapism following regional anesthesia is scarcely reported
 - Especially in the United States
- Most of these cases are reported in the context of urological procedures
 - Ability to compromise the procedure
- Local anesthetics such as bupivacaine are the most commonly reported agent
 - 2 cases with morphine
- Parasympathetic innervation to the penis causes erection through vasodilation
 - Sympathetic innervation causes flaccidity
- Priapism after regional anesthesia is thought to be due to a blockade sympathetic nervous system with uninhibited parasympathetic signaling
- A few cases also reported an increased risk of priapism when the procedure involved genital manipulation
 - Suggesting that a local reflex arc may be involved
- The standard of care treatment for intraoperative priapism is intracorporeal injection of selective α 1 sympathomimetic with generally favorable outcomes

Conclusion

- Priapism due to epidural and spinal anesthesia remains a mysterious phenomenon
- Bupivacaine bolus doses were involved in multiple cases
 - May selectively inhibiting sympathetic tone to the penile vasculature
- Many factors to consider when treating this
 - Including procedural and patient characteristics

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