Epinephrine in digital nerve block

Report by P P Mohan, *Research Fellow, Gastrointestinal Surgery*

Checked by P T Cherian, *Specialist Registrar, Hepatobiliary Surgery*

Good Hope Hospital NHS Trust, Sutton Coldfield, University Hospital Birmingham, UK.

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Abstract

A short cut review was carried out to establish whether epinephrine (adrenaline) is safe to use in digital nerve blocks. A total of 16 papers were found using the reported search, of which seven represented the best evidence to answer the clinical question. The author, date and country of publication,

patient group studied, study type, relevant outcomes, results, and study weaknesses of these best papers are presented in table 2. The clinical bottom line is that epinephrine (1:200 000 to 1:100 000) is safe to use in digital blocks.

Three part question

In [adult patients with no underlying vascular compromise undergoing digital block] is [local anaesthetic with low dose epinephrine as safe as local anesthetic alone] at [achieving analgesia without causing ischaemic complications]?

Clinical scenario

A 25-year-old man presents to the emergency department with a traumatic laceration to his left index finger. The wound needs a thorough clean and will require suturing and you decide to do this using a digital nerve block technique. A colleague who has recently worked in plastic surgery suggests you use epinephrine

Table 2

Author, country, date	Patient group	Study type	Outcomes	Key results	Study weaknesses
Sylaidis <i>et al</i> , 1998, UK	100 consecutive patients. Digital block using 2% lignocaine with 1:80 000 epinephrine	Observational	Digital-brachial pressure index (ratio of digital to brachial artery systolic blood pressures) Finger tip temperature Digital artery blood flow (10 patients, duplex scanner) Ischaemic damage	Mean fall of 19% in digital-brachial pressure index following the block (SD 14.6%). Mean increase of 0.8 (SD 2.3) °C following block Blood flow returned to normal by 1 h in all cases None	The digital blood pressures were not measured at the end of procedure
Wilhelmi <i>et al</i> , 1998, USA	23 digital blocks using 1% lignocaine with epinephrine (1:100 000 or 1:200 000)	Observational	Ischaemic damage	None	Small case series, use of two different strengths of epinephrine
Wilhelmi <i>et al</i> , 2001, USA	Study group (n=31) had digital block using 1% lignocaine with 1:200 000 epinephrine. Control group (n=29) had 1% lignocaine plain	Randomised control trial	Need for tourniquet Need for further anaesthetic dose Ischaemic complications	Study group = 9/31, control group = 20/29, (p<0.002) Study group = 1/31, control group = 5/29 (p=0.098) None	
Denkler, 2001, USA	Review of all reported cases of ischaemic digital necrosis associated with the use of epinephrine from 1880 to 2000	Review	Presence of confounding factors in reported cases of ischaemic damage	21 out of 48 reported cases of digital gangrene involved the use of epinephrine. Confounding factors such as inappropriate concentration of epinephrine, use of older local anaesthetics, excessive volume of injection, prolonged use of tourniquet, use of hot soaks and infection were identified with all reported cases of gangrene	
Altinyazar <i>et al</i> , 2004, Turkey	24 adults undergoing blocks in fingers or toes with 2% lignocaine and 1:100 000 epinephrine	Observational study	Digital artery blood flow at 10 min Digital artery blood flow at 60 min (n=21) Digital artery blood flow at 90 min (n=3)	Fall in peak systolic velocity by 60% and end diastolic velocity by 90% Blood flow returned to pre-block measurement Blood flow returned to pre-block measurement	Small study
Kronic <i>et al</i> , 2004, USA	Review of all reported cases of digital gangrene associated with the use of epinephrine from National Library of Medicine	Review	Presence of confounding factors in the reported cases	21 reported cases of digital gangrene involved the use of epinephrine. Factors such as inappropriate mixing of epinephrine, use of older agents, inappropriate use of tourniquet, use of hot soaks, infection, and large volume of injection were associated with the reported cases. No case reported epinephrine as the sole cause of gangrene	Historical review
Andrades <i>et al</i> , 2003, USA	Study group (n=21) received 2% lignocaine with 1:100 000 epinephrine and control group (n=22) received 2% lignocaine	Randomised control trial	Pain score at 1 h Need for further anaesthetic dose Duration of analgesia Ischaemic damage	Study group = 1.4, control group = 4.1 (p<0.05) Study group = 4%, control group = 24% (p<0.05) Study group = 4.6 h, control group = 2.4 h (p<0.05) None	Small study

(1:100 000) to help with haemostasis, but you have always been told that this can cause finger necrosis and that it should never be done. You wonder whether in fact this is true and decide to look at the evidence for yourself.

Search strategy

Medline search using Pubmed "Anesthesia"[MeSH] OR "Anesthesia, Local"[MeSH] OR "Nerve Block"[MeSH] AND "Epinephrine"[MeSH] AND "Fingers"[MeSH].

Outcome

Sixteen papers were retrieved, of which seven were found to be relevant, including two randomised control trials, three observational studies and two reviews (table 2).

Comments

Two review articles carefully examined the previously reported cases and found that no case had epinephrine as the sole cause of ischaemic complication. Two studies examined the digital perfusion using Doppler flow, and concluded that the blood flow returned to normal by 1 h after epinephrine injection. Other randomised and observational studies showed longer duration of anaesthesia, better analgesia, less need for tourniquets and no ischaemic damage with the use of epinephrine.

This is clearly a controversial topic as it has been emergency medicine dogma that vasoconstrictive agents should not be used in digits. However, the evidence does not support this assertion for all patients. Clinicians may decide to use low concentration epinephrine when they feel this may help the procedure and where there is no underlying reason not to do so.

► CLINICAL BOTTOM LINE

In the absence of underlying vascular compromise, epinephrine (1:200 000 to 1:100 000) is safe to use in digital blocks along with local anaesthetics.

Sylaidis P, Logan A. Digital blocks with adrenaline. An old dogma refuted. *J Hand Surg [Br]* 1998;**23**:17–19.

Wilhelmi BJ, Blackwell SJ, Miller J, *et al*. Epinephrine in digital blocks: revisited. *Ann Plast Surg* 1998;**41**:410–4.

Wilhelmi BJ, Blackwell SJ, Miller JH, *et al*. Do not use epinephrine in digital blocks: myth or truth? *Plast Reconstr Surg* 2001;**107**:393–7.

Denkler K. A comprehensive review of epinephrine in the finger: to do or not to do. *Plast Reconstr Surg* 2001;**108**:114–24.

Altinyazar HC, Ozdemir H, Koca R, *et al*. Epinephrine in digital block: color Doppler flow imaging. *Dermatol Surg* 2004;**30**(4 Pt 1):508–11.

Krunick AL, Wang LC, Soltani K, *et al*. Digital anesthesia with epinephrine: an old myth revisited. *J Am Acad Dermatol* 2004;**51**:755–9.

Andrades PR, Olguin FA, Calderon W. Digital blocks with or without epinephrine. *Plast Reconstr Surg* 2003;**111**:1769–70.

Computed tomography for small bowel obstruction

Report by Usman Jaffer

Checked by Amin Alyas

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Abstract

A short cut review was carried out to establish whether computed tomography (CT) is useful in the management of patients with suspected acute small bowel obstruction (SBO). A total of 348 papers were found using the reported search and manually cross referencing papers, of which 16 represented the best evidence to answer the clinical question. The author, date and country of publication, patient group studied, study type, relevant outcomes, results, and study weaknesses of these best papers are presented in table 3. The clinical bottom line is that CT is a useful investigation in patients presenting with suspected SBO.

Three part question

In an [adult patient presenting with suspected SBO] is [CT] useful in [the diagnosis of obstruction and strangulation].

Table 3

Author, date, country	Patient group	Study type	Outcomes	Key results	Study weaknesses
Ha <i>et al</i> , 1997, South Korea	84 patients with previous laparotomy presenting with small bowel obstruction (SBO) (41 strangulated) undergoing computed tomography (CT) (intravenous (iv) contrast). Malignant/inflammatory obstruction excluded	Case series	CT diagnosis of strangulation	Sensitivity 85%	Retrospective case series
Suri <i>et al</i> , 1999, India	32 patients with suspected SBO undergoing CT	Cohort study	CT diagnosis of, level of and cause of SBO	Diagnosis: sensitivity 93%, specificity 100%, accuracy 94%. Level: sensitivity 93%. Cause: sensitivity 70%	Small numbers
Beall <i>et al</i> , 2002, USA	44 patients with suspected bowel obstruction (28 obstructed) undergoing CT	Cohort study	CT diagnosis of SBO	Accuracy 71%, sensitivity 71%; specificity 71%; positive predictive value (PPV) 83% (n=21)	Small numbers
Lazarus <i>et al</i> , 2004, USA	34 patients with CT findings of small bowel obstruction	Prospective	Presence of small bowel faeces sign (SBFS). Severity of obstruction. Localisation of obstruction.	SBFS present in 55.9%. Present in 16.6% patients with mild obstruction, 72.7% patients with moderate obstruction and 58.8% patients with high grade obstruction. In 94.7% with SBFS level of obstruction found	Small numbers
Scaglione <i>et al</i> , 2004, Italy	120 cases of closed loop SBO who had undergone laparotomy within 6 h of CT (iv contrast) and plain abdominal x ray (AXR).	Retrospective analysis	Diagnosis of closed loop SBO and diagnosis of infarction	CT diagnosed closed loop obstruction in 78%. PPV for CT diagnosis of strangulation 100%, negative predictive value (NPV) 73%	Retrospective analysis
Mallo <i>et al</i> , 2005, USA	11 studies reporting on diagnosis of ischaemia in SBO (743 patients). 7 studies reporting on complete/high grade obstruction (408 patients)	Systematic review	Aggregated PPV, NPV, sensitivity and specificity for CT diagnosis of obstruction and infarction	For bowel ischaemia: PPV 79%, NPV 93%, sensitivity 83%, specificity 92%. For bowel obstruction: PPV 92%, NPV 93%, sensitivity 92%, specificity 94%	