Critique author	**Ed Whitney**

Bibliographic Data	
Authors	Livingstone JA, Atkins RM
Title	Intravenous regional guanethidine blockade in the treatment of post-traumatic complex regional pain syndrome type 1 (algodystrophy) of the hand.
PMID	12002497
Citation	J Bone Joint Surg Br. 2002 Apr;84(3):380-6.
Other information if relevant	

Methods	
Aim of study	To assess the therapeutic effectiveness of guanethidine IV regional blocks (IVRB) in patients with CRPS-I after a Colles' fracture
Design	Randomized clinical trial

Participants	
Population from which participants are drawn	All patients presenting with a closed unilateral Colles' fracture who showed signs of CRPS when followed up 9 weeks after treatment for the fracture
Setting (location and type of facility)	The Bristol Royal Infirmary in the UK
Age	61
Sex	3 men, 54 women
Total number of participants for whom outcome data were reported	57

Inclusion criteria	CRPS diagnosed according to the IASP criteria using a verbal questionnaire and examination wherein alteration in hand swelling, color, temperature, and sweating were each awarded one point, and CRPS was defined as a score of 3 or more
Exclusion criteria	- Surgical fixation of the fracture - The presence of another injury of the upper limb - Pre-existing abnormality of the hand which would affect the measurements - Inability to cooperate with the assessment - Medication with known or possible anti-sympathetic effects - Contraindication to sympathetic blockade - Inability to receive an IVRB within 2 weeks of assessment
Other information if relevant	

Intervention Groups

Group 1	
Group name	Guanethidine IVRB
Number in group	27
Description of intervention	- Injection with 15 ml of guanethidine monosulfate in 30 ml of 0.5% prilocaine HCl
Duration of treatment period	- Assessments were done before each block and again 24 hours, 48 hours, and one week after - Injections could be given at weekly intervals for up to four weeks
Co-interventions if reported	- Physical therapy with simple active and passive exercise, started 48 hours after the injection
Additional information if relevant	- All injections were done with a padded double-cuff tourniquet in an anesthetic suite for a total of 20 minutes, 10 minutes for the proximal and 10 minutes for the distal cuff

Group 2	
Group name	Saline injection
Number in group	30

Description of intervention	- Injection with 30 ml normal saline
Duration of treatment period	- Same as guanethidine group
Co-interventions if reported	- Same as guanethidine group
Additional information if relevant	- Same as guanethidine groiup

Primary outcome	
Outcome name and criteria for definition	- Finger tenderness as measured by the dolorimetry ratio - This is assessed by an examiner who applies a commercial compression gauge to the finger of the patient and records pain thresholds in the affected and the opposite finger - A normal dolorimetry ratio is considered to be 0.85 or greater - A dolorimetry ratio less than 0.85 is considered to represent abnormal tenderness on the side with the lower pain threshold, and is evidence of CRPS in that hand - A responder was defined as a patient whose dolorimetry ratio returned to a level of 0.85 or greater following an injection
Time points measured and/or reported	- 24 hours, 48 hours, and one week after each block - Further followup assessments were done at 15, 20, and 30 weeks
Differences between groups	- Both groups of patients had statistically similar responses to injection - After the first injection, 14/27 guanethidine patients, and 17 of 30 saline patients were responders - Patients who did not respond to the first block, or who relapsed after having responded to the first block, could have a second block, and this was the case for 18 guanethidine and 17 saline patients - After the second block, there were 12/18 responders to guanethidine and 8/17 responders to saline, which again is a statistically similar frequency of response - Analysis at followup for up to 30 weeks showed improvement in dolorimetry ratios for both groups in similar frequencies
Additional information if relevant	

Secondary outcomes	
Outcome name and criteria for definition	- Vasomotor and sudomotor instability - Verbal questionnaire and examination to identify alteration in hand swelling, color, temperature, and sweating
Time points measured	15, 20, and 30 weeks
Differences between groups	- Symptoms of vasomotor instability were slower to resolve in the guanethidine group than in the saline group - At 15 weeks, the guanethidine group was significantly more likely than the saline group to complain of the affected hand being red or blue - At 30 weeks, there were no differences with respect to change in hand color, but a greater proportion of guanethidine patients (69%) than saline patients (14%) complained of altered hand temperature
Additional information if relevant	

Conclusions	
Key conclusions of study authors	- IV regional block with guanethidine had no advantage over saline block on the primary outcome measure - There is no evidence to support the use of IV guanethidine blockade in CRPS, and these blocks may delay the resolution of some features of the condition

Risk of bias assessment		
Domain	Risk of bias Low High Unclear	Comments
Random sequence generation *(selection bias)*	Low	Assignment was by coin toss

Allocation concealment *(selection bias)*	Low	
Blinding of participants and personnel *(performance bias)*	Low	The injections were of equal volume and were colorless, and were drawn up by an independent clinician in a separate room from the anesthetic suite
Blinding of outcome assessment *(detection bias)*	Unclear, probably low	The blinding in the injection phase was probably maintained in the assessment phase, but there is not an explicit statement that the examiner on the followup visits was blindedTHe
Incomplete outcome data *(attrition bias)*	Low	
Selective outcome reporting? *(reporting bias)*	Unclear	There is no protocol to determine the primary outcome when the study was planned
Other bias		

Sponsorship if reported		
Study funding sources if reported	The Arthritis Research Council	
Possible conflicts of interest for study authors	None stated	
Notes:		

Comments by DOWC staff

- The primary outcome is the dolorimetry ratio, which has been used in some studies of CRPS but is less familiar than many other outcome measures such as pain scores and functional disability questionnaires
- In the comparison of vasomotor instability at 15 weeks, which was higher in the guanethidine than in the saline group, only the frequency of hand color alteration for the guanethidine group is stated, and the corresponding frequencies for the saline group are omitted
- The study had an 80% power to detect a 40% difference between groups in responder rates as defined by a dolorimetry ratio of 0.85 or greater

Assessment by DOWC staff	
Overall assessment as suitability of evidence for the guideline ☐ High quality ☒ Adequate ☐ Inadequate	Adequate for some evidence that there is little advantage of IV regional block with guanethidine over saline blocks with respect to the resolution of tenderness in the affected hand, but the resolution of vasomotor instability may be delayed by guanethidine
If inadequate, main reasons for recommending that the article not be cited as evidence	

Additional references if relevant
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