WELCOME *To the*

2026 SYMPOSIUM

NERVE BLOCKS FOR ACCESS CREATION AND MAINTENANCE

M LIBBY WEAVER, MD MHPE FACS

ASSOCIATE PROGRAM DIRECTOR, VASCULAR SURGERY FELLOWSHIP

DIRECTOR OF CLINICAL OPERATIONS EFFICIENCY, VASCULAR SURGERY DIVISION

UNIVERSITY OF UTAH SPENCER FOX ECCLES SCHOOL OF MEDICINE

VASCULAR ACCESS SOCIETY OF THE AMERICAS VASA Access Excellence.

MAY 20-22, 2026 • HILTON SALT LAKE CITY CENTER • SALT LAKE CITY, UTAH

Miscellaneous Arteriovenous Access Topics

DISCLOSURES

None

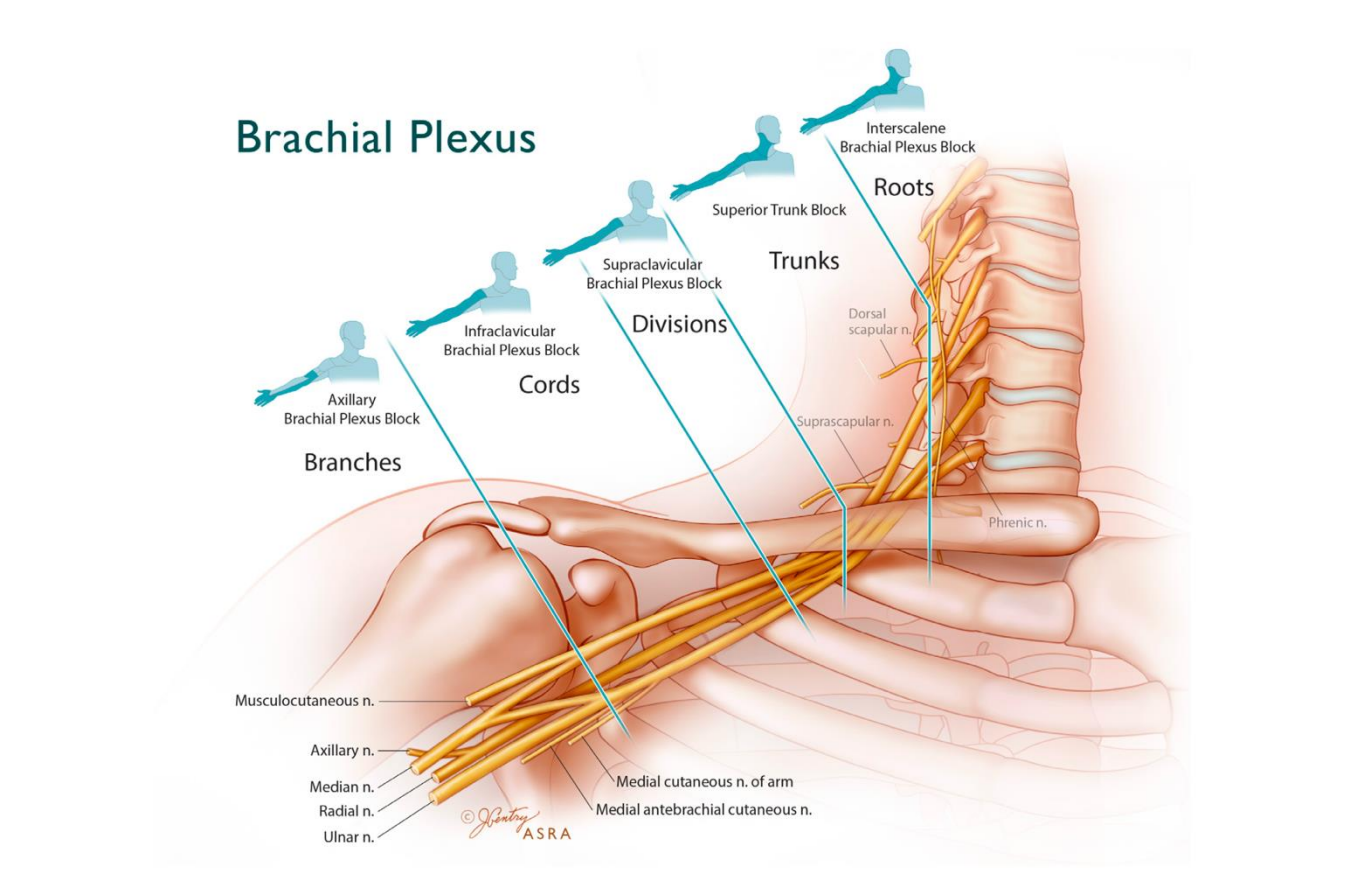
INTRODUCTION

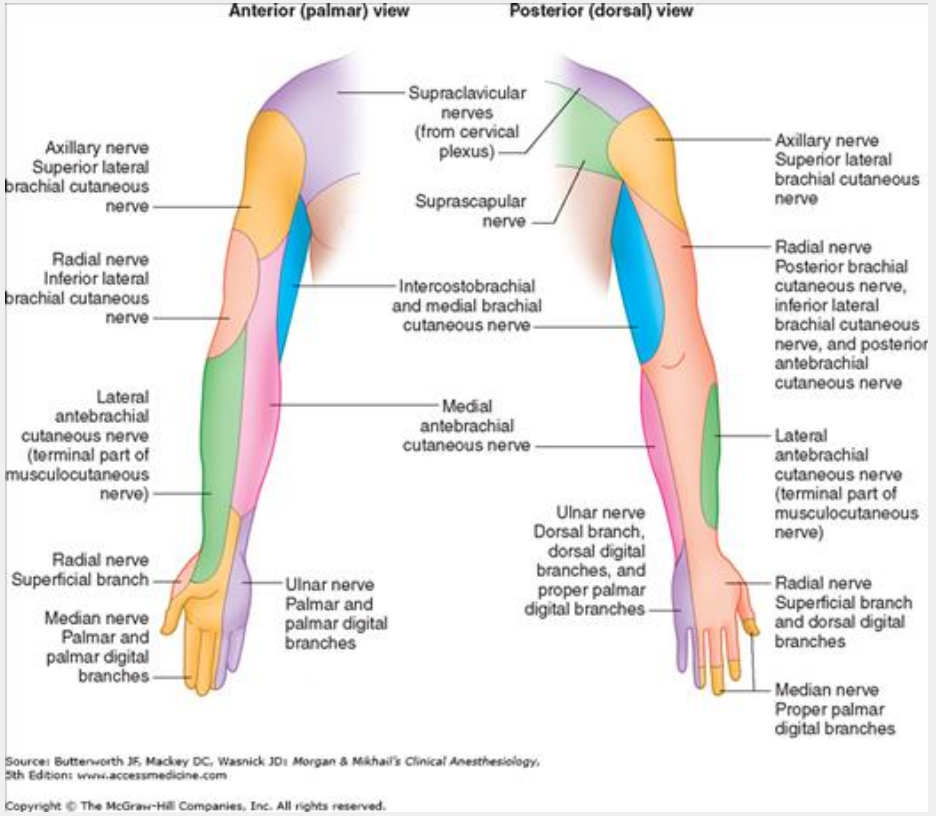
What are ‘nerve blocks’ in dialysis access?

- Regional anesthesia in the form of brachial plexus block (pre-op)
- Local anesthesia directly injected on the field

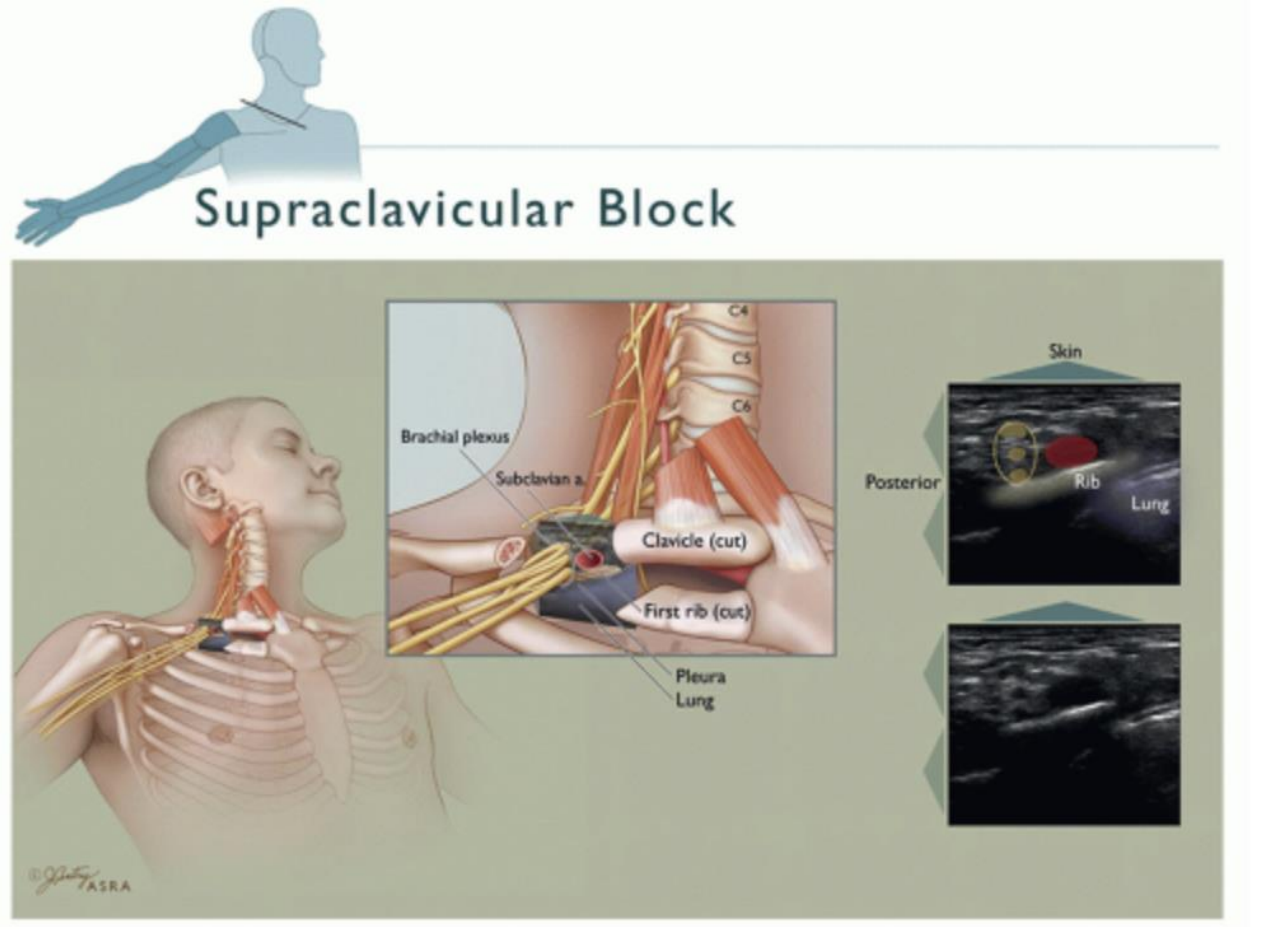
Either can be used with conscious sedation as an alternative to general anesthesia, or in conjunction with GA.

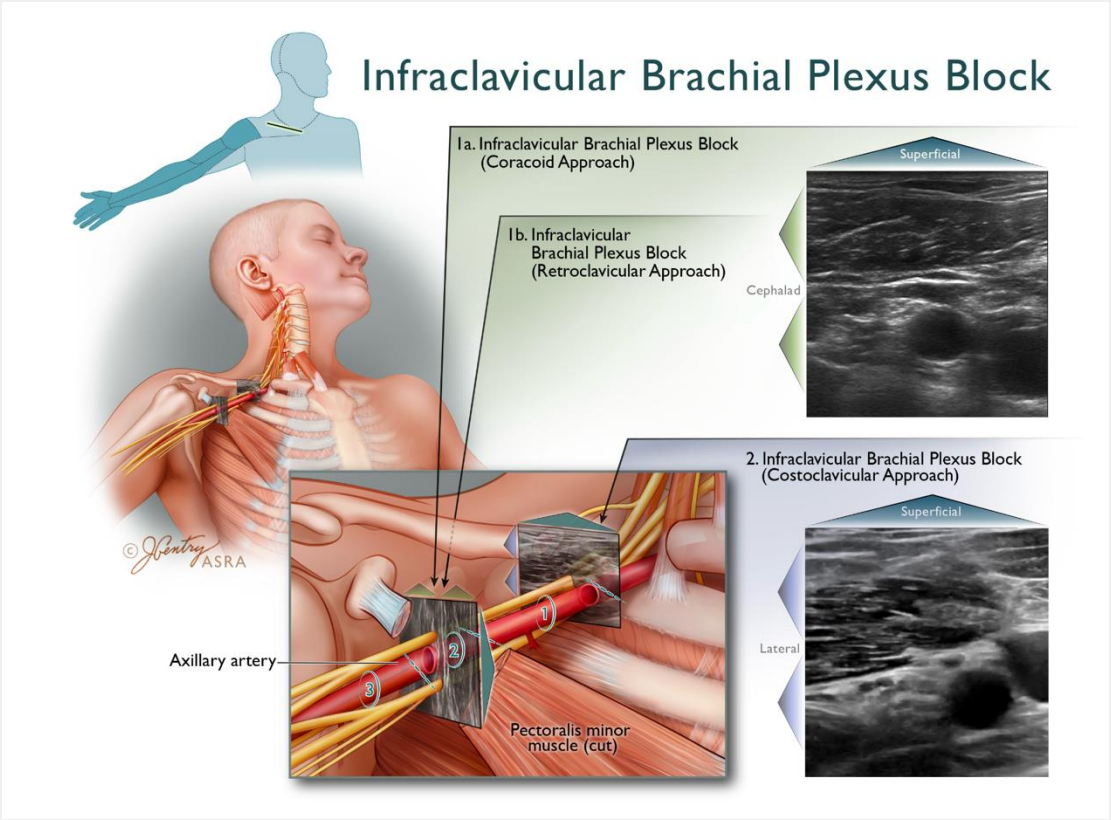
BRACHIAL PLEXUS REGIONAL NERVE BLOCK



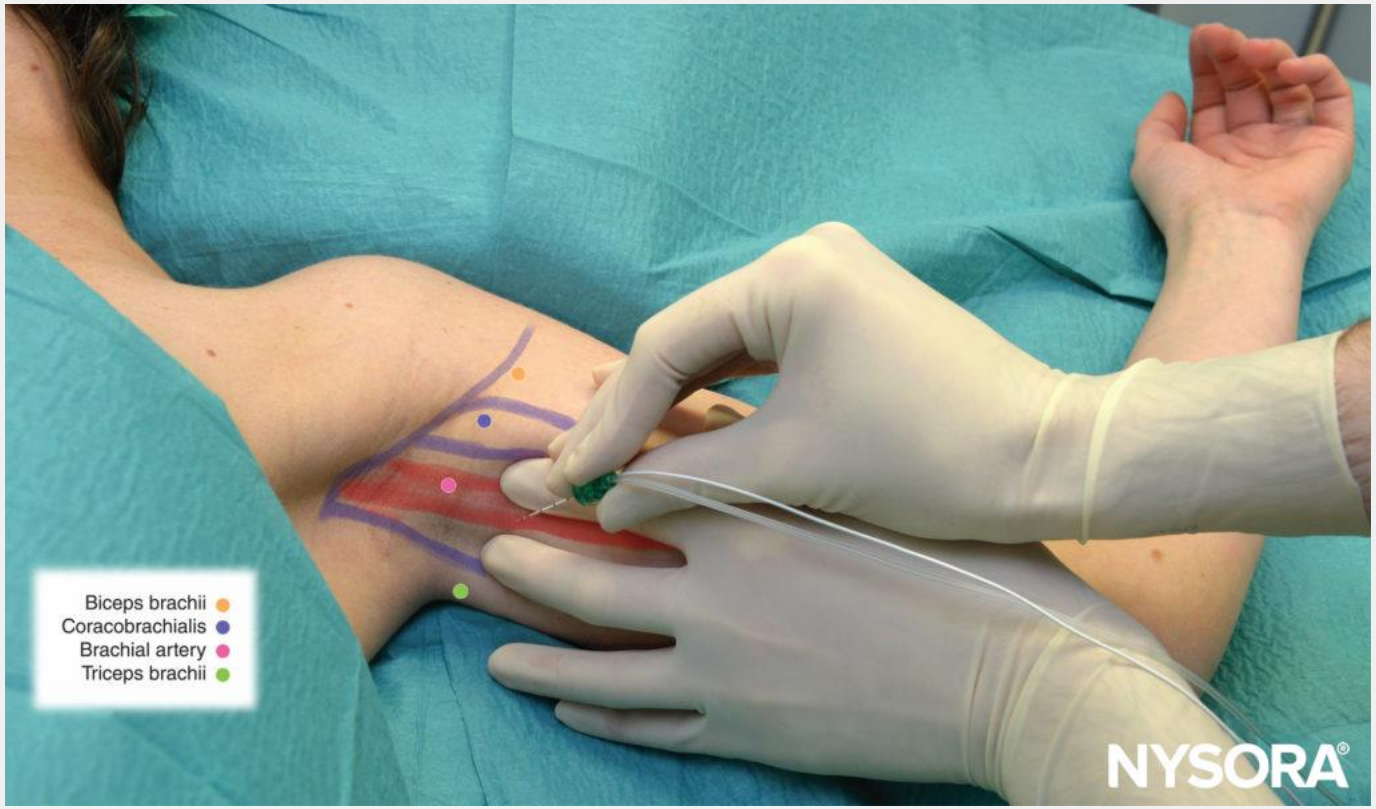


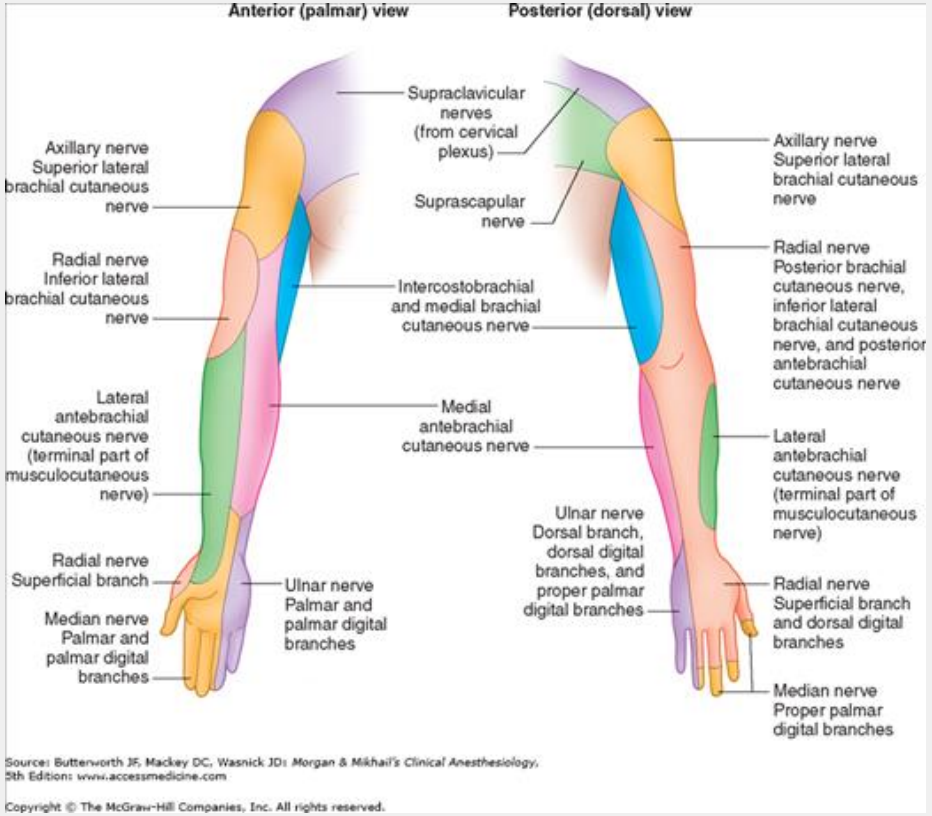
SUPRA/INFRACLAVICULAR REGIONAL NERVE BLOCK



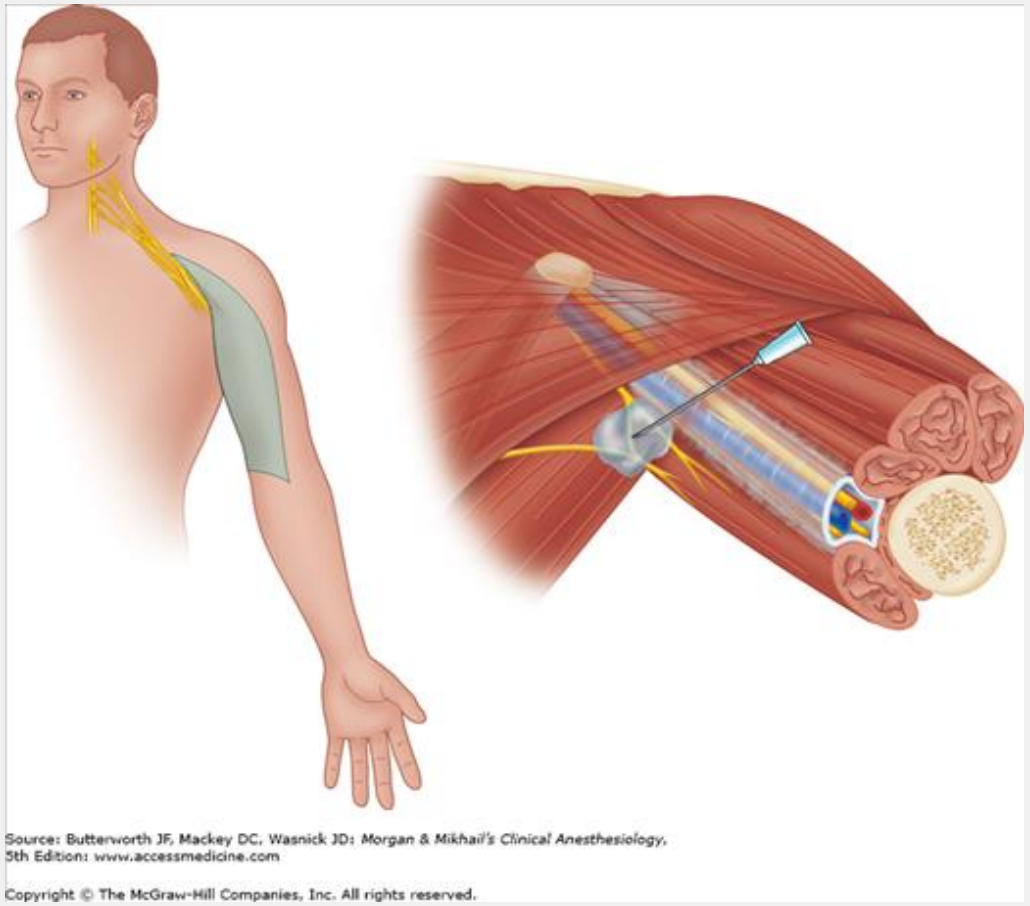


AXILLARY REGIONAL NERVE BLOCK





LOCAL FIELD BLOCK

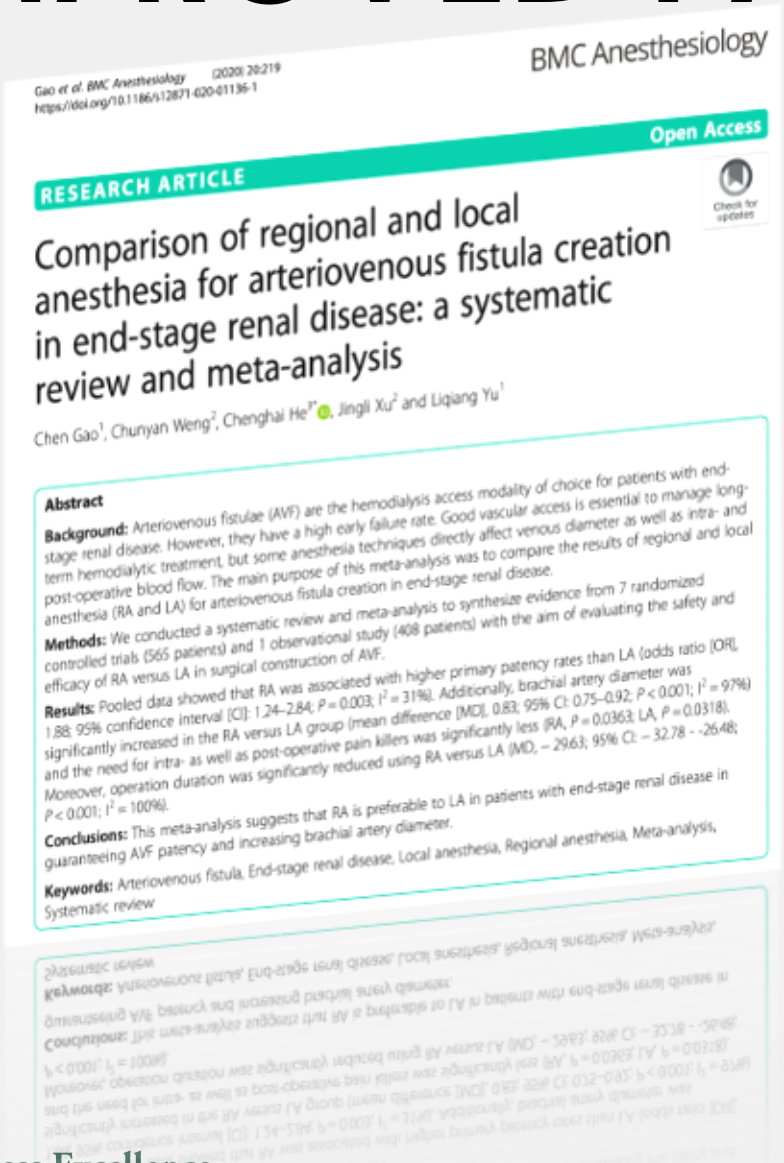


- Direct local injection of lidocaine intraoperatively to cover medial upper arm
- Cut 50/50 with saline to achieve adequate volume
- Revisions and maintenance

IMPROVED SURGICAL OPTIONS

- Sympathetic blockade > venodilation
- Vein diameter size increase of 0.6 mm on average
  (Looking for 3mm vein for use)
- 30%-40% change in operative planning
  - Graft to fistula
  - Fistula to more distal fistula (ie BCAVF > RCAVF)

IMPROVED PATENCY



Gao et al. BMC Anesthesiology (2020) 20:219
https://doi.org/10.1186/s12871-020-01136-1

BMC Anesthesiology

RESEARCH ARTICLE

Open Access

Comparison of regional and local anesthesia for arteriovenous fistula creation in end-stage renal disease: a systematic review and meta-analysis

Chen Gao[1], Chunyan Weng[2], Chenghai He[1*], Jingli Xu[2] and Liqiang Yu[1]

Abstract

Background: Arteriovenous fistulae (AVF) are the hemodialysis access modality of choice for patients with end-stage renal disease. However, they have a high early failure rate. Good vascular access is essential to manage long-term hemodialytic treatment, but some anesthesia techniques directly affect venous diameter as well as intra- and post-operative blood flow. The main purpose of this meta-analysis was to compare the results of regional and local anesthesia (RA and LA) for arteriovenous fistula creation in end-stage renal disease.

Methods: We conducted a systematic review and meta-analysis to synthesize evidence from 7 randomized controlled trials (565 patients) and 1 observational study (408 patients) with the aim of evaluating the safety and efficacy of RA versus LA in surgical construction of AVF.

Results: Pooled data showed that RA was associated with higher primary patency rates than LA (odds ratio [OR], 1.88; 95% confidence interval [CI]: 1.24–2.84; $P = 0.003$; $I^2 = 31\%$). Additionally, brachial artery diameter was significantly increased in the RA versus LA group (mean difference [MD], 0.83; 95% CI: 0.75–0.92; $P < 0.001$; $I^2 = 97\%$) and the need for intra- as well as post-operative pain killers was significantly less (RA, $P = 0.0363$; LA, $P = 0.0318$). Moreover, operation duration was significantly reduced using RA versus LA (MD, − 29.63; 95% CI: − 32.78 - -26.48; $P < 0.001$; $I^2 = 100\%$).

Conclusions: This meta-analysis suggests that RA is preferable to LA in patients with end-stage renal disease in guaranteeing AVF patency and increasing brachial artery diameter.

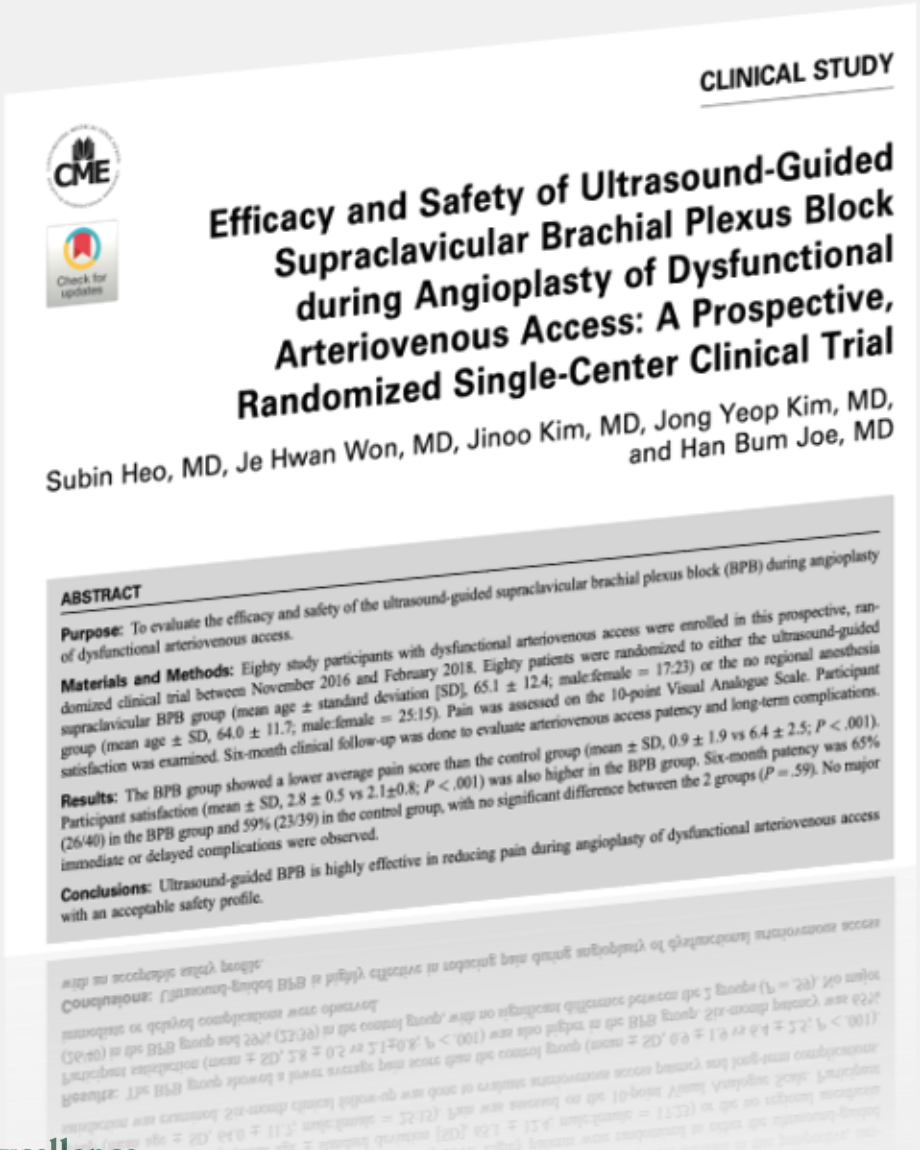
Keywords: Arteriovenous fistula, End-stage renal disease, Local anesthesia, Regional anesthesia, Meta-analysis, Systematic review

- Improved primary patency with the use of regional block
- More likely to create functional access
- Also demonstrated in pediatric population

PERIOPERATIVE BENEFIT

- ESRD patients have specific peri-operative considerations
  (Especially pertinent to avoid hemodynamic fluctuations)
- 30-day mortality of ESRD undergoing elective operation is 4x greater than non-ESRD patients
  (Cardiopulmonary complications)
- Reduced operative time
- Reduced LOS
- Reduced Opioid Use
- Lower Costs
- Lower Infection Rates

REGIONAL BLOCK IN MAINTENANCE



CLINICAL STUDY

Efficacy and Safety of Ultrasound-Guided Supraclavicular Brachial Plexus Block during Angioplasty of Dysfunctional Arteriovenous Access: A Prospective, Randomized Single-Center Clinical Trial

Subin Heo, MD, Je Hwan Won, MD, Jinoo Kim, MD, Jong Yeop Kim, MD, and Han Bum Joe, MD

ABSTRACT

Purpose: To evaluate the efficacy and safety of the ultrasound-guided supraclavicular brachial plexus block (BPB) during angioplasty of dysfunctional arteriovenous access.

Materials and Methods: Eighty study participants with dysfunctional arteriovenous access were enrolled in this prospective, randomized clinical trial between November 2016 and February 2018. Eighty patients were randomized to either the ultrasound-guided supraclavicular BPB group (mean age ± standard deviation [SD], 65.1 ± 12.4; male:female = 17:23) or the no regional anesthesia group (mean age ± SD, 64.0 ± 11.7; male:female = 25:15). Pain was assessed on the 10-point Visual Analogue Scale. Participant satisfaction was examined. Six-month clinical follow-up was done to evaluate arteriovenous access patency and long-term complications.

Results: The BPB group showed a lower average pain score than the control group (mean ± SD, 0.9 ± 1.9 vs 6.4 ± 2.5; $P < .001$). Participant satisfaction (mean ± SD, 2.8 ± 0.5 vs 2.1±0.8; $P < .001$) was also higher in the BPB group. Six-month patency was 65% (26/40) in the BPB group and 59% (23/39) in the control group, with no significant difference between the 2 groups ($P = .59$). No major immediate or delayed complications were observed.

Conclusions: Ultrasound-guided BPB is highly effective in reducing pain during angioplasty of dysfunctional arteriovenous access with an acceptable safety profile.

- Lower pain scores
- Higher patient satisfaction
- Better patency (not statistically significant)

REGIONAL BLOCK IN REVISION



Distal revascularization and interval ligation for dialysis access-related ischemia is best performed using arm vein conduit

M. Libby Weaver, MD,[a] Courtenay M. Holscher, MD, PhD,[a] Alexis Graham, MD,[a] and Thomas Reifsnyder, MD,[b]
Baltimore, Md

ABSTRACT

Objective: Distal revascularization and interval ligation (DRIL) is an effective approach to the management of hemodialysis access-related ischemia that offers both symptom relief and access salvage. The great saphenous vein (GSV) has been the most commonly used conduit. However, the use of an ipsilateral arm vein will allow for performance of the operation with the patient under regional anesthesia and might result in lower harvest site morbidity than the GSV. We sought to determine the suitability of DRIL using an arm vein compared with a GSV conduit.

Methods: All patients who had undergone DRIL from 2008 to 2019 were retrospectively identified in the electronic medical records. The characteristics and outcomes of those with an arm vein vs a GSV conduit were compared using the Wilcoxon log-rank and χ^2 tests. Access patency was examined using Kaplan-Meier methods, with censoring at lost to follow-up or death.

Results: A total of 66 patients who had undergone DRIL for hand ischemia were included in the present study. An arm vein conduit was used in 40 patients (median age, 65 years; 25% male) and a GSV conduit in 26 patients (median age, 58 years; 19% male). No significant differences in comorbidities were found between the two groups, with the exception of diabetes mellitus (arm vein group, 78%; GSV group, 50% GSV; $P = .02$). No difference in the ischemia stage at presentation was present between the groups, with most patients presenting with stage 3 ischemia. Also, no differences in patency of hemodialysis access after DRIL between the two groups were found ($P = .96$). At 12 and 24 months after DRIL, 86.9% (95% confidence interval [CI], 68.3%-94.9%) and 82.0% (95% CI, 61.3%-92.3%) of patients with an arm vein conduit had access patency compared with 93.8% (95% CI, 63.2%-99.1%) and 76.9% (95% CI, 43.0%-92.2%) of those with a GSV conduit, respectively. All but one patient had symptom resolution. The incidence of wound complications was significantly greater in the GSV group than in the arm vein group (46% vs 11%; $P = .003$). DRIL bypass had remained patent in all but one patient in each group, with a median follow-up of 18 months (range, 1-112 months) in the arm vein conduit group and 15 months (range, 0.25-105 months) in the GSV conduit group.

Conclusions: DRIL procedures using an arm vein have advantages over those performed with the GSV. In our series, symptom resolution and access salvage were similar but distinctly fewer wound complications had occurred in the arm vein group. Additionally, the use of an arm vein conduit avoids the need for general anesthesia. If an ipsilateral arm vein is available, it should be the conduit of choice when performing DRIL. (J Vasc Surg 2021;73:1368-75.)

- Similar 12 and 24-month patency. No difference in long-term conversion to graft.
- 50% of arm vein as outpatient, <20% of GSV
- Wound complication rates of 11% vs 46% (arm vs GSV)

Brachial Plexus Block: Complication Comparison by Approach

Incidence reflects ultrasound-guided technique. Rates vary with volume, technique, and operator experience.

High — frequent / clinically significant | Moderate — noteworthy / situational | Low — rare with US guidance | Negligible — none expected

Complication	Supraclavicular	Infraclavicular	Axillary
RESPIRATORY			
Phrenic nerve palsy	Moderate 17–50%; low-volume US reduces risk	Low 0–11% with US guidance	Negligible Not at risk anatomically
Pneumothorax	Moderate <0.5% US-guided; up to 6% landmark	Low Rare; higher with poor visualization	Negligible No pleural risk
NEUROLOGIC / AUTONOMIC			
Horner's syndrome	Moderate ~19–33%	Low 4–12%; cranial LA spread	Negligible Not expected
Peripheral nerve injury (PONS)	Moderate Trunks closely packed	Low Cords more distinct; US-guided	Low Terminal branches well visualized
VASCULAR / SYSTEMIC			
Vascular puncture / hematoma	Moderate Subclavian artery adjacent; non-compressible	Moderate Axillary vessels adjacent; non-compressible	Moderate Axillary vessels adjacent; compressible site
Local anesthetic systemic toxicity (LAST)	Low High vascularity; US + incremental injection	Low Similar risk profile	Low High axillary vascularity; aspiration essential
COVERAGE & AVF SUITABILITY			
Block coverage gaps	Minimal Best overall arm coverage; rare ulnar miss	Low May miss musculocutaneous / axillary nerves	Moderate Musculocutaneous requires separate injection
Suitability — pulmonary comorbidity	Caution Moderate phrenic risk; use low volume	Preferred Low phrenic risk; good for upper arm AVF	Preferred No phrenic/pneumothorax risk; ideal wrist AVF
Steal / IMN masking risk*	Present All approaches carry equal risk	Present All approaches carry equal risk	Present All approaches carry equal risk

*No dedicated literature; risk inferred from IMN differential diagnosis and compartment syndrome masking literature. LAST = local anesthetic systemic toxicity. PONS = peripheral nerve surgery neurologic symptoms. IMN = ischemic monomelic neuropathy. US = ultrasound.

CONCLUSION

- Regional nerve blocks provide significant advantages for dialysis access creation, revision, and maintenance procedures including improved technical success, patency, and functionality
- Complications of blocks are rare
- Overall, benefits greatly outweigh the risks



Thank You!

M. Libby Weaver, MD MHPE
libby.weaver@hsc.utah.edu