USG Eşliğinde Rejyonel Anestezi

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Endikasyonlar

- Ekstremitelerin akut ağrı yönetimi
- Sedoanaljeziye ve narkotiklere alternatif
- Kompleks kesi onarımı
- Apse drenajı
- Yabancı cisim çıkarılması
- Kırık – çıkık redüksiyonları

VIDEOS IN CLINICAL MEDICINE
SUMMARY POINTS

Julie R. Ingelfinger, M.D., Editor

Peripheral Nerve Blocks for Hand Procedures

Janak Chandrasoma, M.D., T. Kyle Harrison, M.D., Howard Ching, M.D., Lindsey Vokach-Brodsky, M.D., and Larry F. Chu, M.D.

The following text summarizes information provided in the video.

From the Anesthesia Informatics and Media Lab, Stanford University, Stanford, CA.

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OVERVIEW

This video provides an overview of how to administer a peripheral nerve block, which is also called regional anesthesia. Peripheral nerve block of the wrist or hand is used primarily for the repair of hand lacerations. However, the procedure can be used to induce regional anesthesia for the treatment of a variety of injuries, including dislocations, paronychia, and felon drainage. This video demonstrates the techniques used to administer both a digital nerve block and a wrist block.[1]

Local anesthesia is achieved through the subcutaneous injection and infiltration of anesthetic agents at the margins of a wound. In contrast, a peripheral nerve block is achieved through the injection of local anesthetic solutions around a specific peripheral nerve in order to anesthetize its entire sensory distribution.[2]

One advantage of using a peripheral nerve block for the repair of a superficial hand laceration is that a lesser amount of local anesthetic agent is required for anesthesia, a characteristic that can decrease the risk of adverse anesthetic-induced events.[3] Other advantages of the use of anesthesia as compared with local anesthetic infiltration include less painful injection and less distortion of the tissue; these features can aid in repair of the laceration.

Peripheral nerve block for the repair of a superficial hand laceration requires a high degree of cooperation from the patient. The patient must remain still and must be able to communicate with the clinician during both preparation and the procedure itself.[4]

This video does not cover the repair of deep hand lacerations. You may need to consult a hand specialist for the evaluation and repair of such wounds, since their repair may require surgical intervention in the operating room.

The techniques shown here for inducing peripheral nerve block of the hand are based on the location of surface anatomical landmarks on the finger for the digital nerve and on the wrist for the radial, median, and ulnar nerves. Ultrasound-guided techniques allow visualization of anatomical structures. These techniques require special training and are not demonstrated in this video.

INDICATIONS

A peripheral nerve block is indicated when there is a need for surgical anesthesia in a conscious patient. Patients with a superficial laceration of a single finger may benefit from a digital nerve block. A wrist block may be indicated if lacerations involve multiple fingers, if the injury requires extensive irrigation or débridement,

Avantajları

- Uygulama zamanında kısalma
- İğne giriş sayısının azalması
- Daha az anestetik madde enjeksiyonu
- Kompleks bloklarda başarı şansının artması

Avantajları

- Hedef siniri ve onun etrafındaki dokuların görünürlüğünü artırır
- Dopler USG kullanımı ile vasküler non vasküler ayırımı
- İstenmeyen intranöral enjeksiyonları azaltır

Avantajları

- Lokal anesteziğin hedef sinirin etrafına dağılımını görüntüleyerek başarılı blok olanağı sağlar
- Anatomik anomali veya patolojileri tanımayı sağlar

Anaesthesia 2015, 70, 1084–1091 doi:10.1111/anae.13098

Review

A systematic review and meta-analysis of ultrasound versus electrical stimulation for peripheral nerve location and blockade*

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3 Honorary Reader, Institute of Academic Anaesthesia, University of Dundee Medical School, Dundee, UK

Summary

We systematically reviewed peripheral nerve blockade guided by ultrasound versus electrical stimulation. We included 26 comparisons in 23 randomised controlled trials of 2125 participants. Ultrasound reduced the rate of pain during the procedure, relative risk (95% CI) 0.60 (0.41–0.89), $p = 0.01$. Ultrasound with or without electrical stimulation reduced the rate of analgesic or anaesthetic rescue versus electrical stimulation alone, relative risk (95% CI) 0.40 (0.29–0.54) and 0.29 (0.16–0.52), respectively, $p < 0.0001$ for both. The rate of rescue was unaffected by the addition of electrical stimulation to ultrasound, relative risk (95% CI) 1.07 (0.54–2.10), $p = 0.85$. Ultrasound, with or without electrical stimulation, reduced the pooled rate of vascular puncture, relative risk (95% CI) 0.23 (0.15–0.37), $p < 0.0001$. There was no difference in the rate of postoperative neurological side-effects, relative risk (95% CI) 0.76 (0.53–1.09), $p = 0.13$.

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**Presented in part at the European Society of Regional Anaesthesia and Pain Therapy's Annual Congress, Glasgow, 2013.*

Dikkat!!!

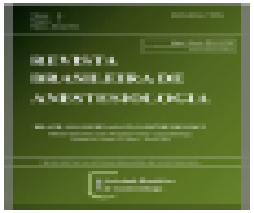
- İşlem öncesi tam nörolojik muayene
  - Dokunma
  - Ağrı
  - Motor hareket
  - İki nokta diskriminasyonu

Kontrendikasyonlar

- Allerji
- Enjeksiyon bölgesinde aktif enfeksiyon
- Kompartman sendromu riski taşıyan yaralanmalar
- Koopere olmayan hastalar
- Aşırı obez
- Kanama bozuklukları
- Önceden nörolojik defisit varlığı

Rev Bras Anestesiol. 2017;67(1):100–106

REVISTA BRASILEIRA DE ANESTESIOLOGIA



Case 5

FAS, male, 32 years old, ASA 3 due to thromboangiitis obliterans, taking enoxaparin 60 mg 12/12 h. The patient was brought to the operating room for debridement of left forefoot ulcer.

Surgical schedule

Surgical debridement of left forefoot ulcer.

Proposed anesthetic technique

Ultrasound-guided femoral and sciatic nerve blocks.

Ultrasound-guided sciatic nerve block was performed, popliteal approach, with 0.375% bupivacaine (20 mL) without vasoconstrictor, associated with 1.5% lidocaine (20 mL) without vasoconstrictor.

Surgical procedure was uneventful, with duration of 1 h under light sedation. Taken to PACU, the patient evolved with adequate pain control and no neurological deficits seen in the first postoperative period.

Table 1 Summary of ultra

	Aspirin	Age	B	Hematoma	Nerve stimulator
Case 1	3	63	F	No	Yes
Case 2	4	57	F	No	Yes
Case 3	3	74	F	No	Yes
Case 4	3	54	I b	No	No
Case 5	3	32	F	No	No
Case 6	4	73	I b	No	No
Case 7	3	71	F	No	No
Case 8	4	65	F	No	Yes
Case 9	3	71	F	No	No

Conclusions: This case series support the discussion on conducting surface peripheral nerve blocks and easy local knowledge as the axillary, interscalene, femoral, saphenous or popliteal in anticoagulated patients, on dual antiaggregation therapy and/or with other coagulation disorders, provided that guided by ultrasound and performed by an anesthesiologist with extensive experience in guided nerve blocks. However, larger series should be performed to prove the safety of the technique for these patients.

Lokal Anestetik Ajanlar

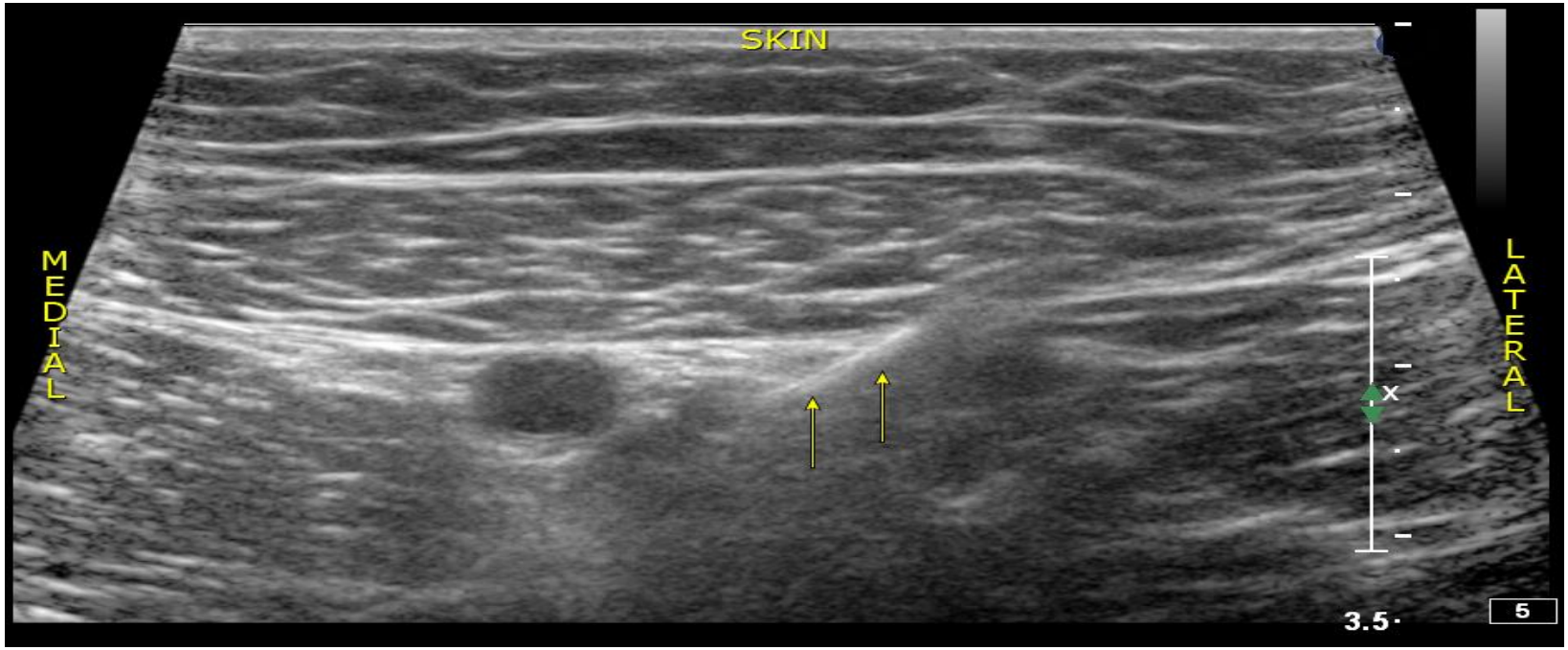
İlaç	Konsantrasyon (%)	Etki başlama (dak)	Etki süresi (dak)	Max doz mg/kg
Lidokain	1-1.5	Hızlı <2 dak	60-180	300 mg
Mepivakain	1.5-2.0	Hızlı 3-5 dak	120-140 Pik 15-45 dak	400mg
Bupivikain	0.25-0.5	Yavaş 4-10 dak	240-360+ Pik 30-45 dak	175mg
Ropivakain	0.5-1	Yavaş 10-30 dak	300-600+	250mg

Hazırlık

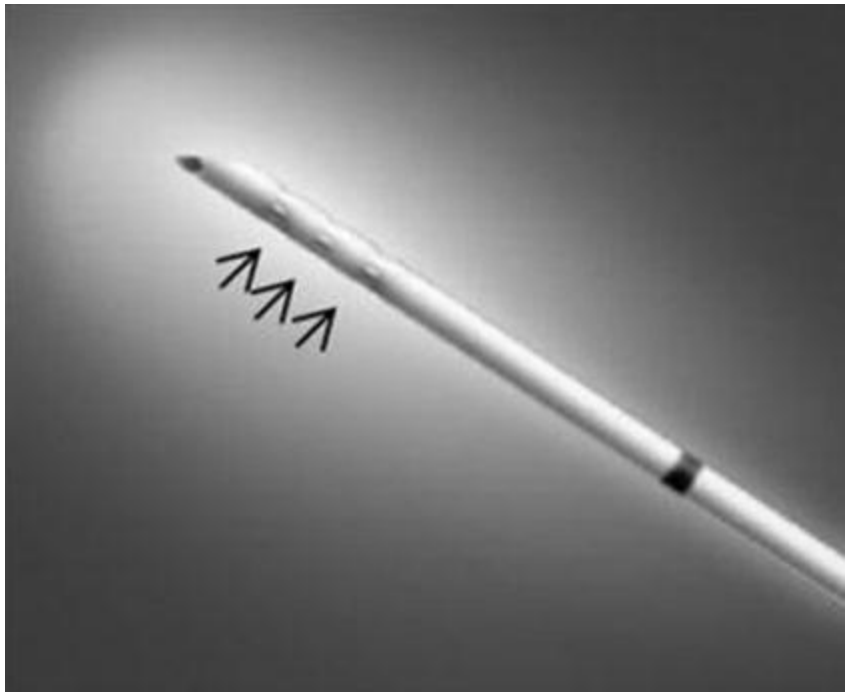
- Öykü
  - İlaç alerjisi, medikasyonlar, sistemik hastalıklar
- Aydınlatılmış onam
- Gerekli malzemelerin hazırlanması
  - Lokal anestezide kullanılan anestetikler
- Hasta pozisyonu
- Sahanın temizliği

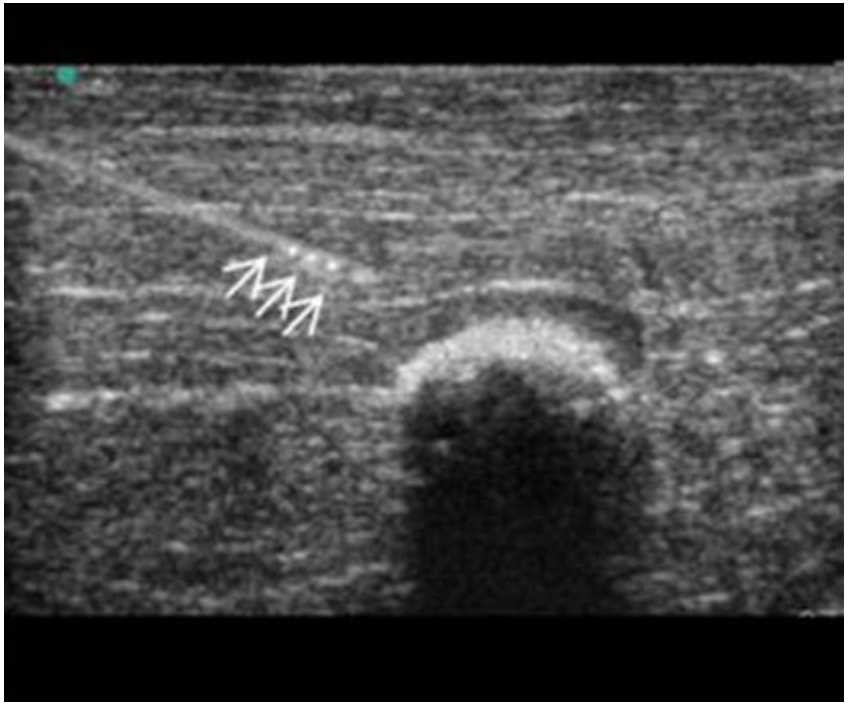
İğne Tercihi

- Doku hasarını, vasküler ponksiyon, yanlış lokal anestetik enjeksiyonu,
- Metal blok uçlu, büyük çaplı



Ekojenik uçlu iğneler





Prob Seçimi

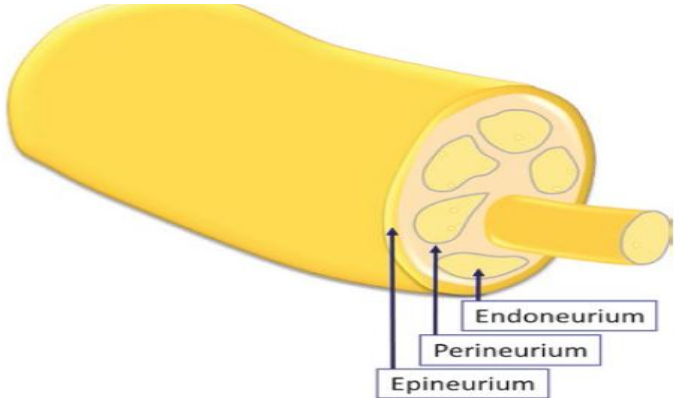
- Uygulama için optimum şekil, boyut ve frekans
- Yeterli derinlikte penetrasyona izin, veren en yüksek frekansa sahip
  - Süperfisyal sinirler için lineer
  - Derin sinirler için konveks prob kullanılır

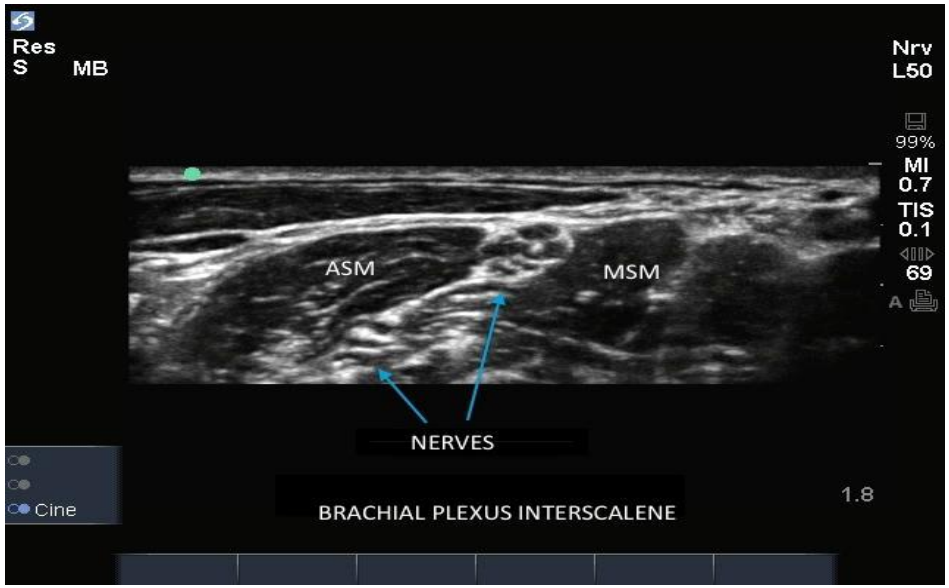
Sinir Lokalizasyonu

- Anatomik belirteçler
  - Genellikle periferik sinirler büyük bir arterle beraber seyreder
  - Dezavantaj = Anatomik varyasyonlar
- Periferal sinir stimülatörü
- USG

Periferik Sinirlerin Normal USG Görüntüsü

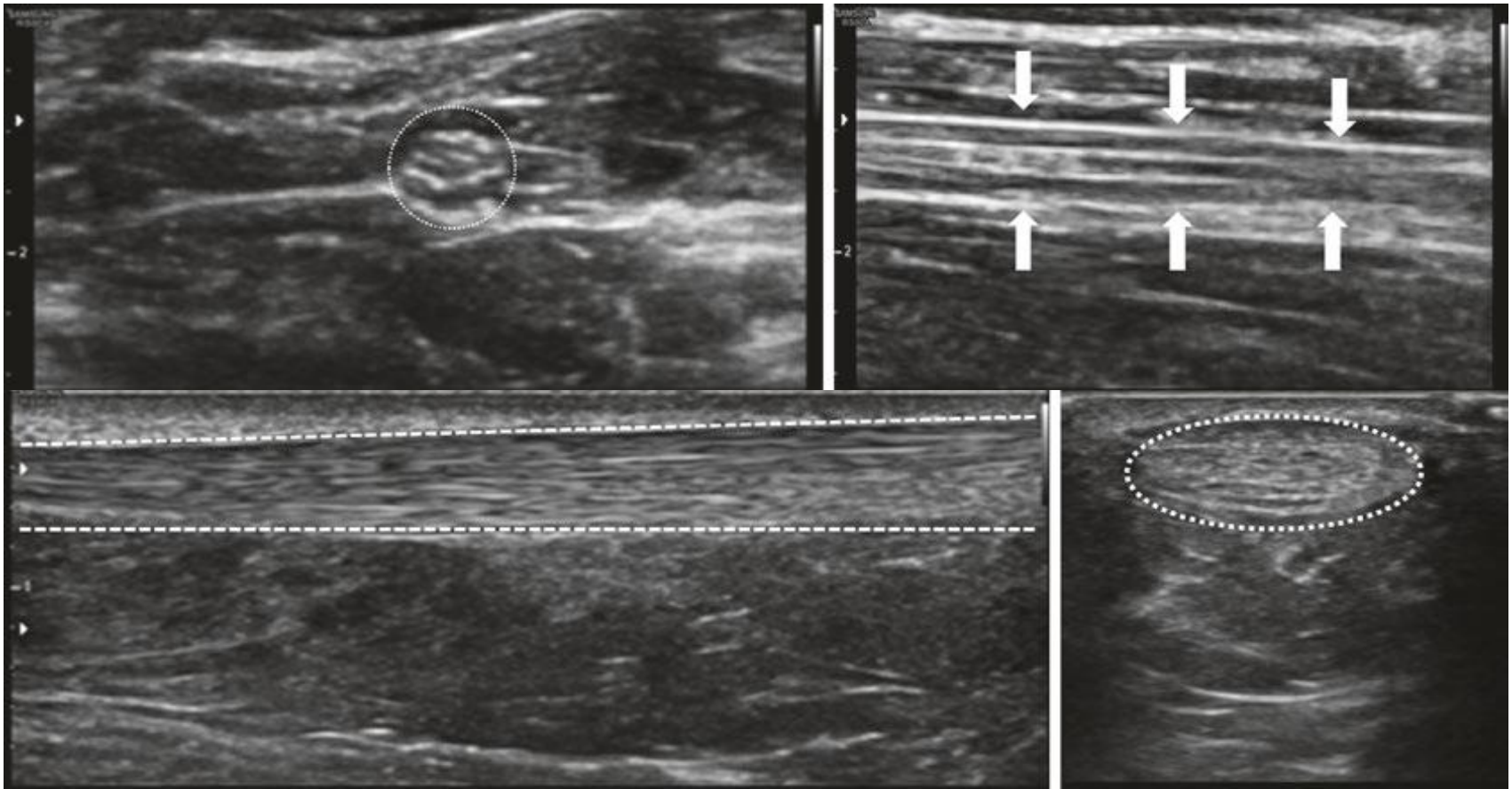
- Sinir lifleri, hiperekoik ve homojen perinöryum ve endoneryum içine gömülü hipoekoik alanlar olarak karşımıza çıkar
  - **Bal peteği görünümü**





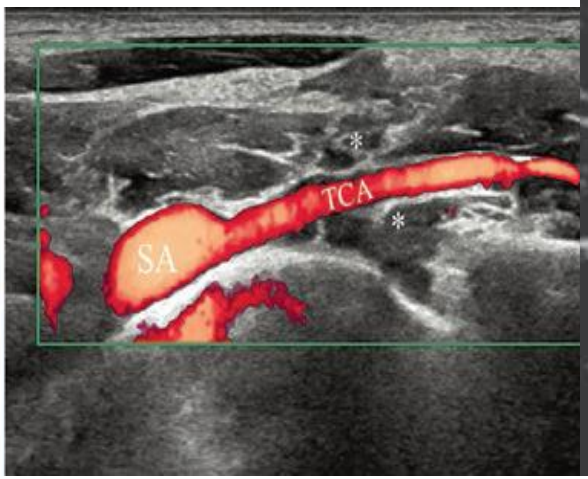
Periferik Sinirlerin Normal USG Görüntüsü

- Daha distal, küçük uçlarda sinirler myelinize aksonlar içerir ve USG görüntüsü **tendonları taklit edebilir**



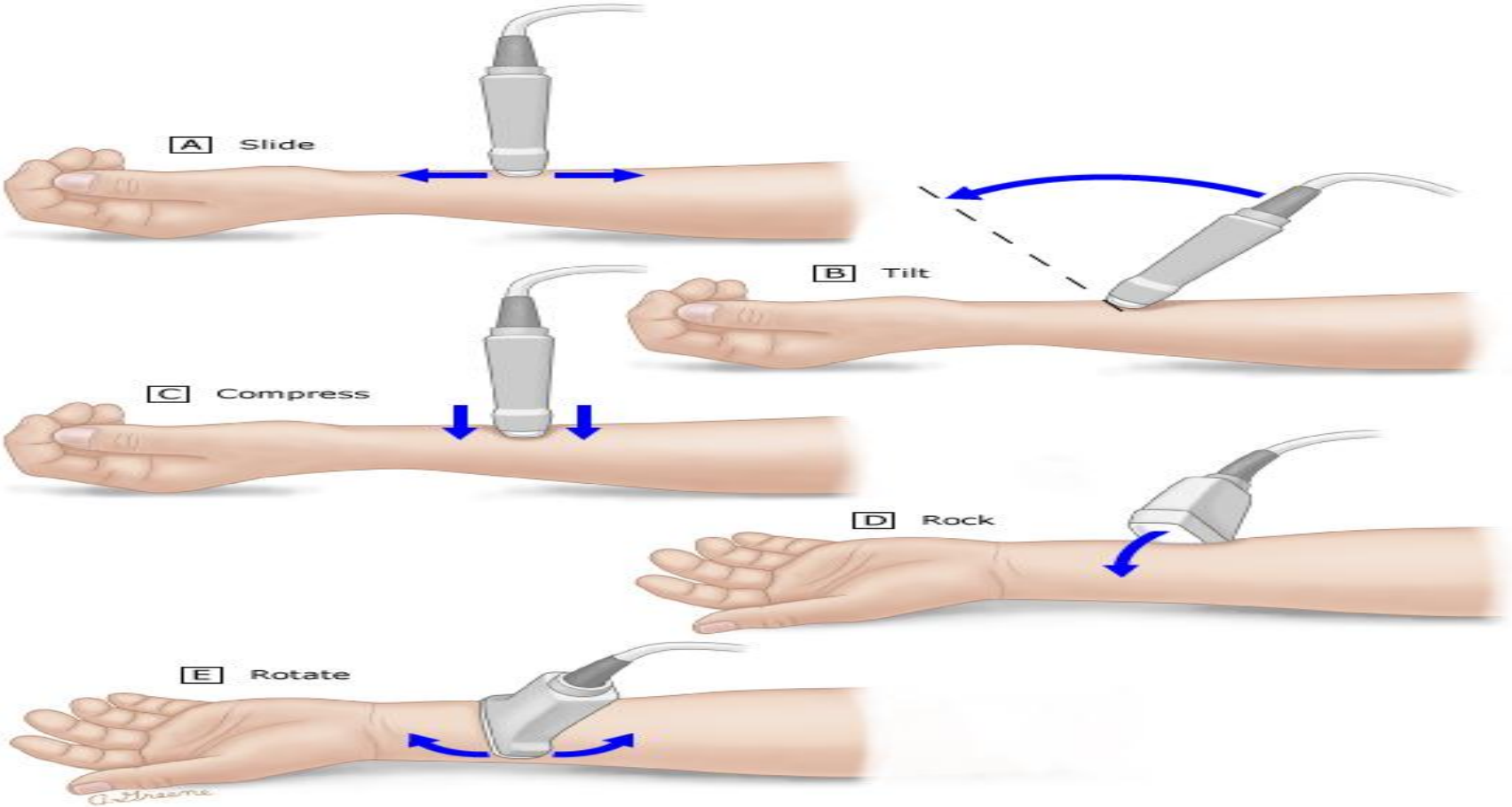
Periferik Sinirlerin Normal USG Görüntüsü

- Bulunduğu bölgeye, seyrine ve çevre dokuyla ilişkisine bağlı olarak **oval**, **yuvarlak** ya da **üçgen** şeklinde izlenebilir
- Yanında genellikle damarların seyretmesi görüntülemede yardımcıdır
  - Damarlar komprese edilebilmeleri ve doppler görüntüleri ile sinirden kolayca ayırt edilebilirler



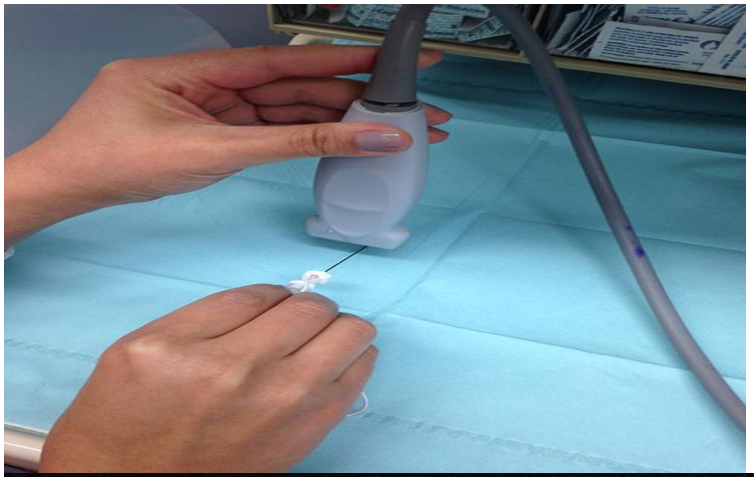
Ultrason Tekniği

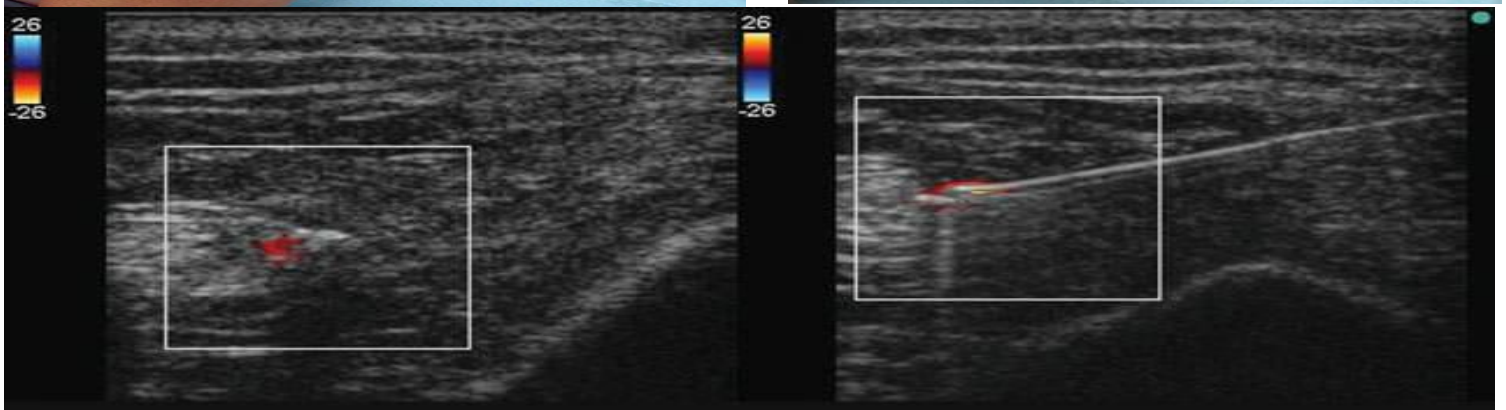
- Prob hareketleri



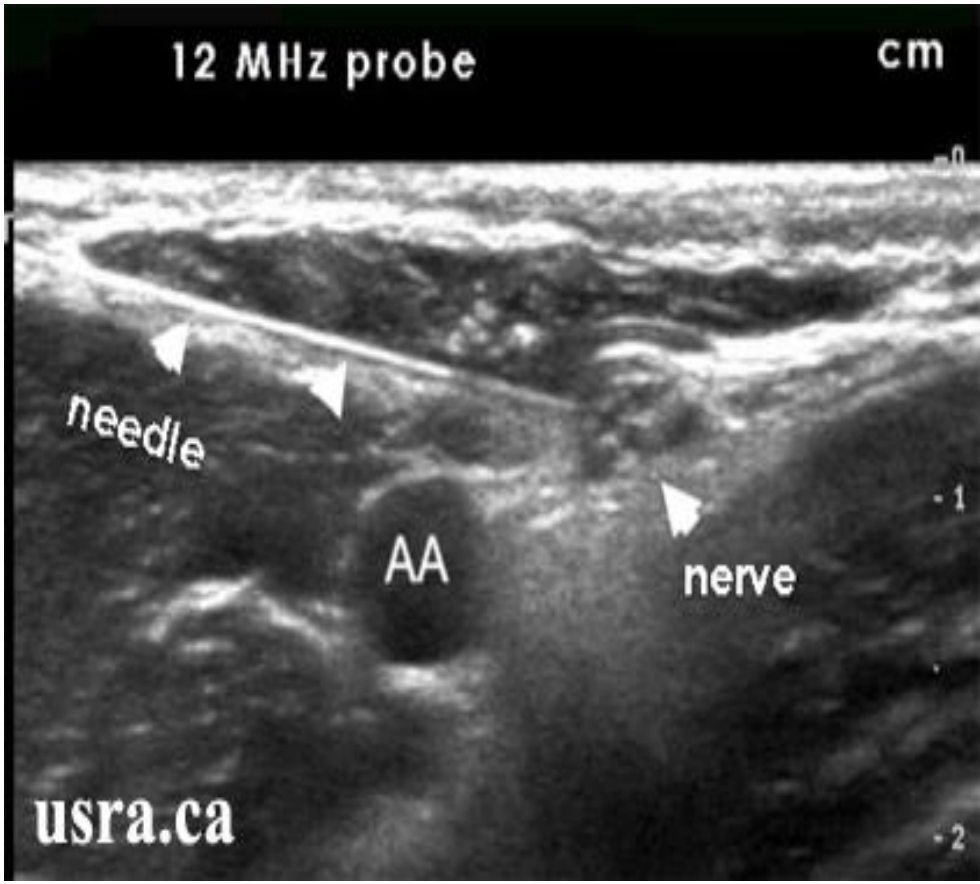
Ultrason Tekniği

- Ön tarama
- Steril prob hazırlama
- Düzlem içi ve dışı uygulama

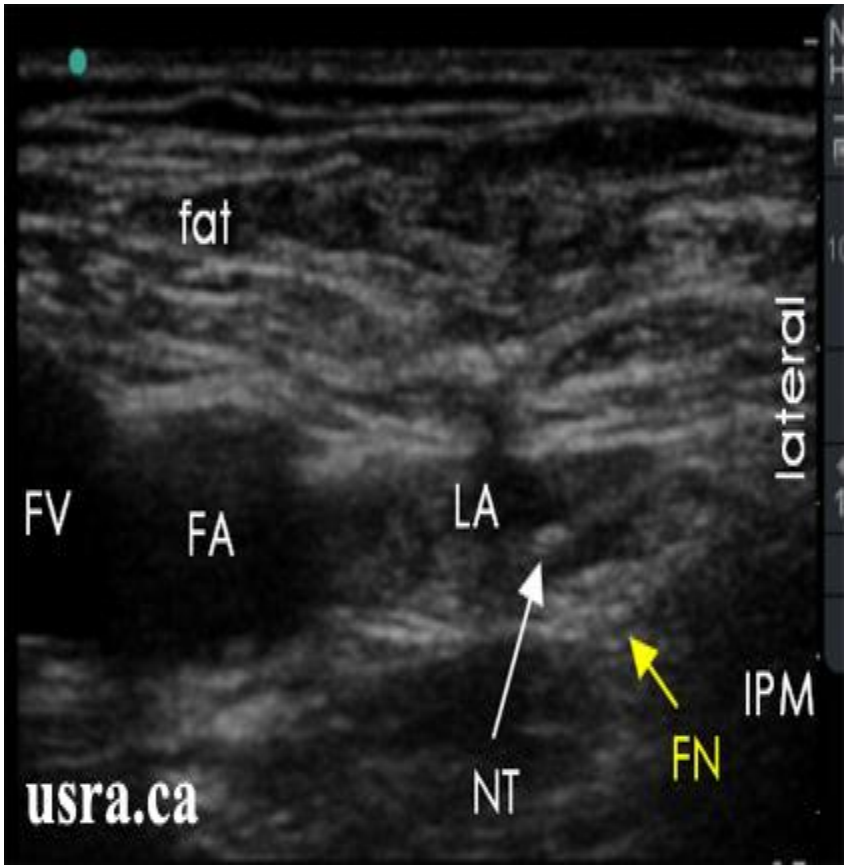




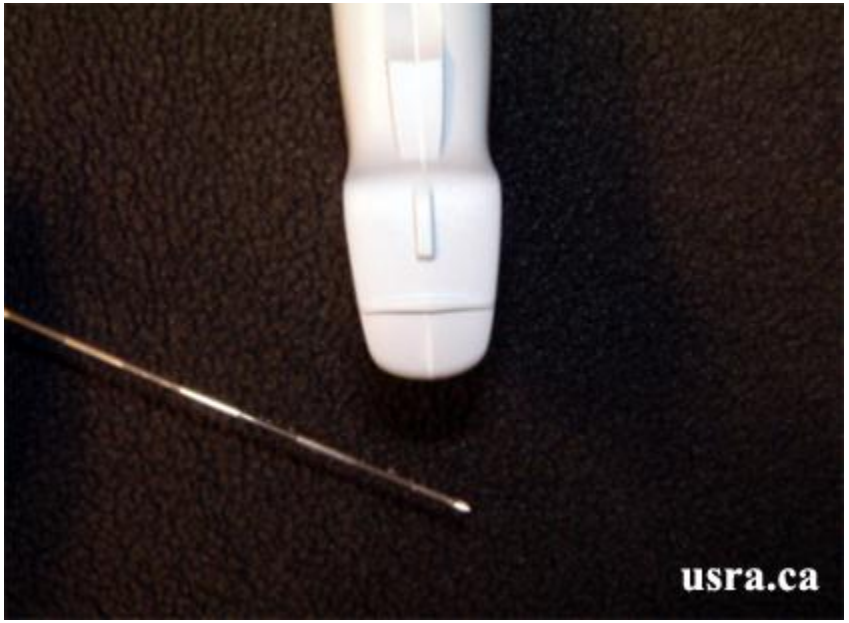
Düzlem İçi(In plane)



Düzlem Dışı(Out of plane)

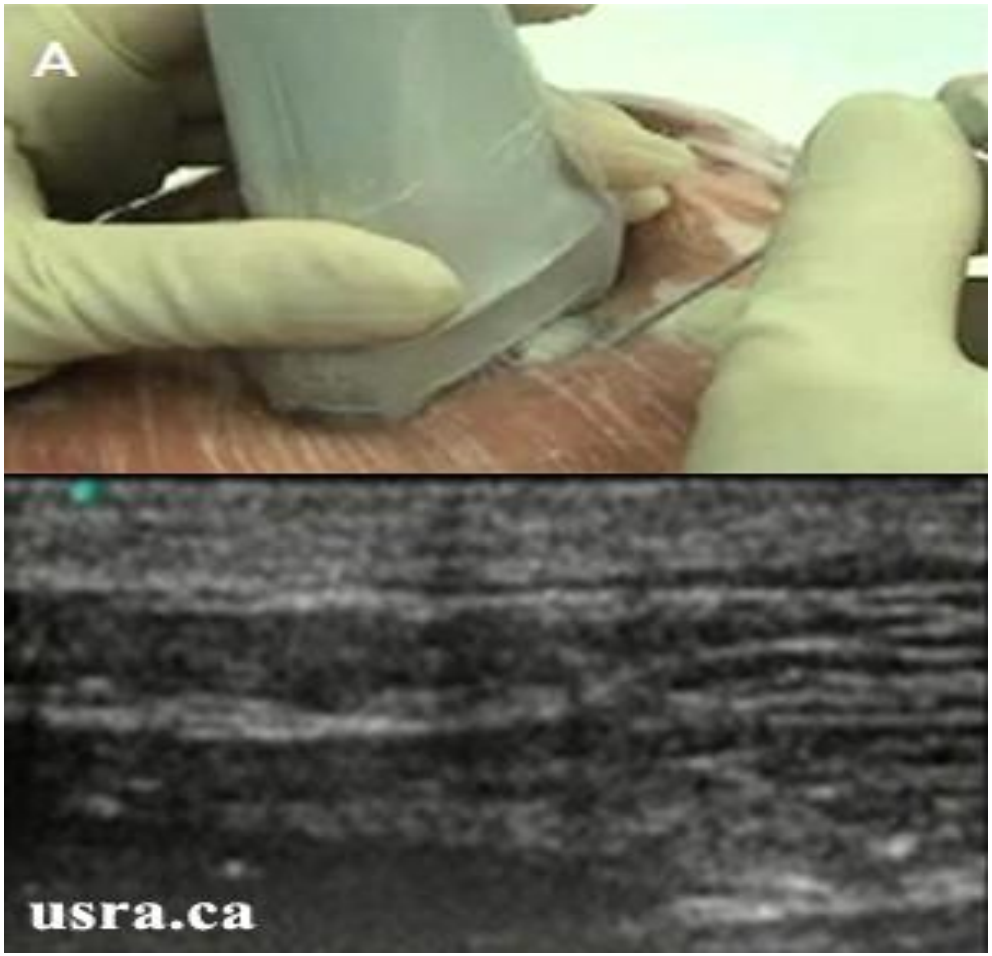


Düzlem Dışı(Out of plane)



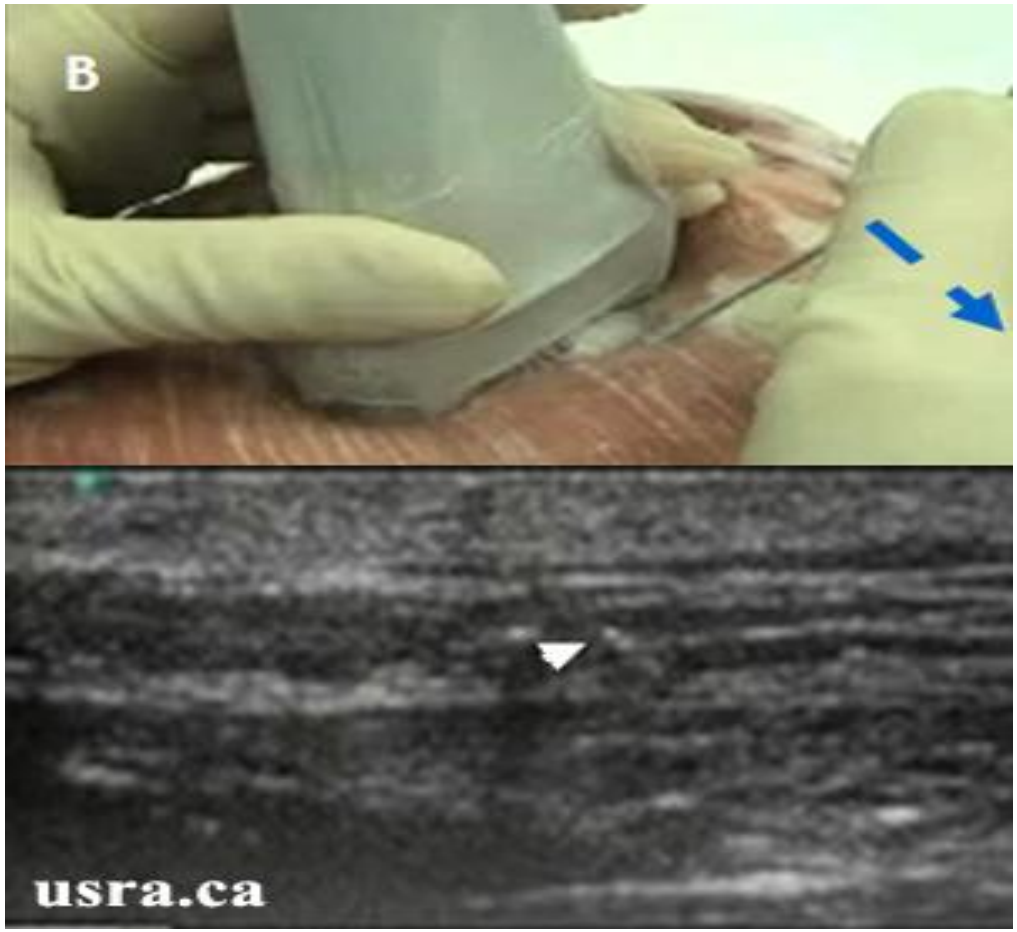
Görünen beyaz nokta?

Düzlem Dışı(Out of plane)



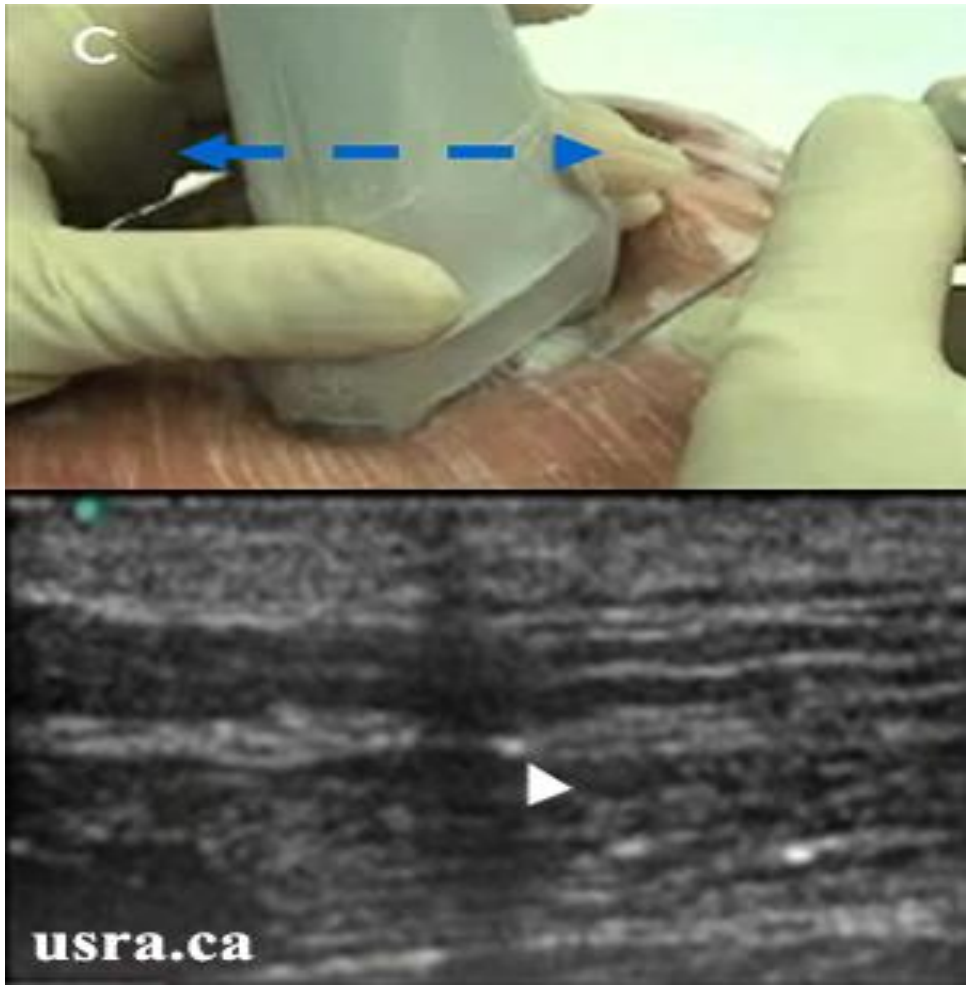
İğne ucu ?

Düzlem Dışı(Out of plane)



- İğne mavi ok yönünde eğilerek prob altında görünür hale getirilmeye çalışılır

Düzlem Dışı(Out of plane)



- İğne ucunu görünür hale getirmek için prob mavi oklar yönünde öne arkaya hareket

Düzlem İçi(In plane)

Hem iğne hem ucu net olarak izlenir

Düzlem İçi(In plane)

DİKKAT

İğne ile probu aynı hatta tutun, uygun hat sağlanmazsa iğne ucu görüntüden çıkar

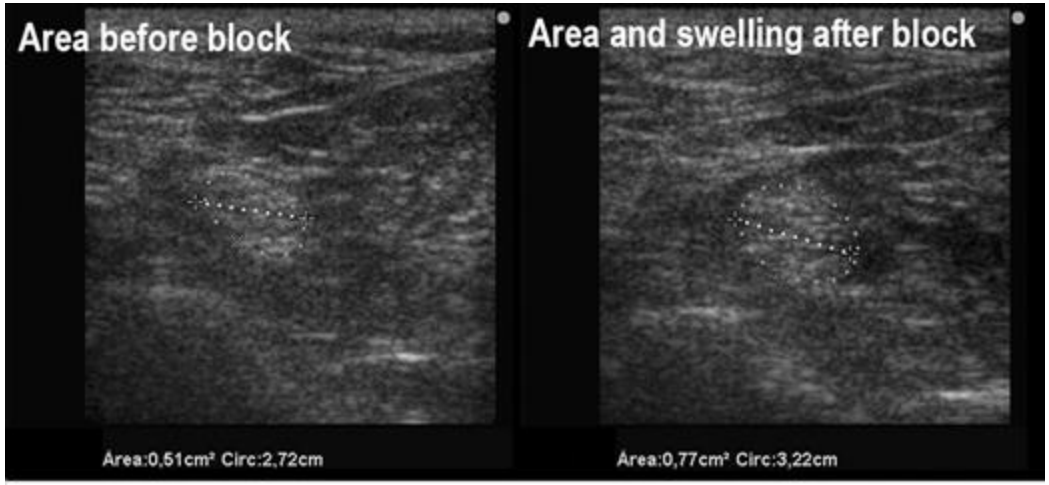
Enjeksiyon Tekniği

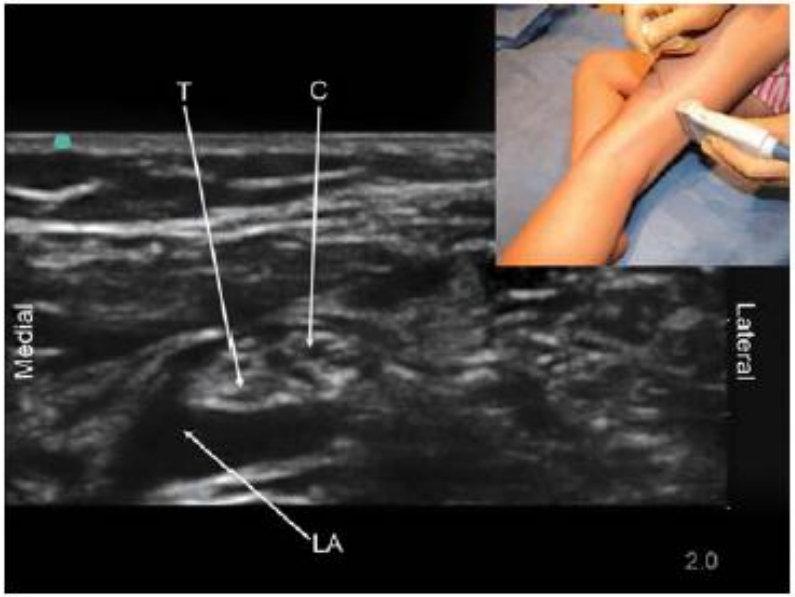
- Aspirasyon; enjeksiyondan önce ve her 5 cc enjeksiyon sonrası tekrar edilmeli
- Enjeksiyon basıncı; 20 cc lik enjektörle yavaş ve tedbirli verilmeli, güç uygulanmamalı
- Direnç; enjeksiyona son verilmeli, iğnenin yeri değiştirilmeli

Enjeksiyon Tekniği

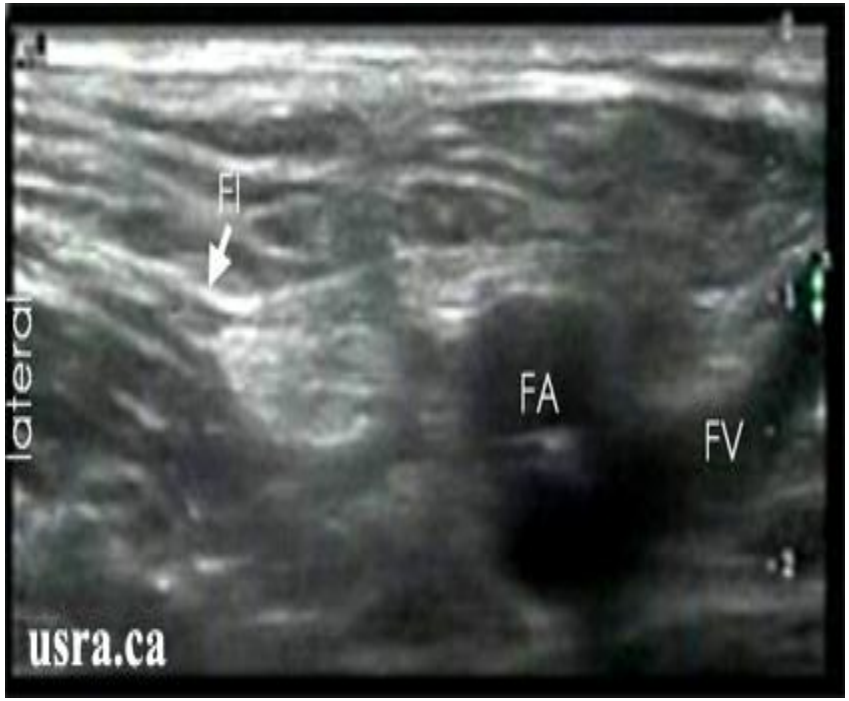
- İğne ucunun sinire direkt temas etmemesine dikkat edilir
- Lokal anestetik ajan perinöral alana verilir
- USG'de hipoekoik sıvının sinir etrafına yayılımı gözlenir
  - "donut sign"

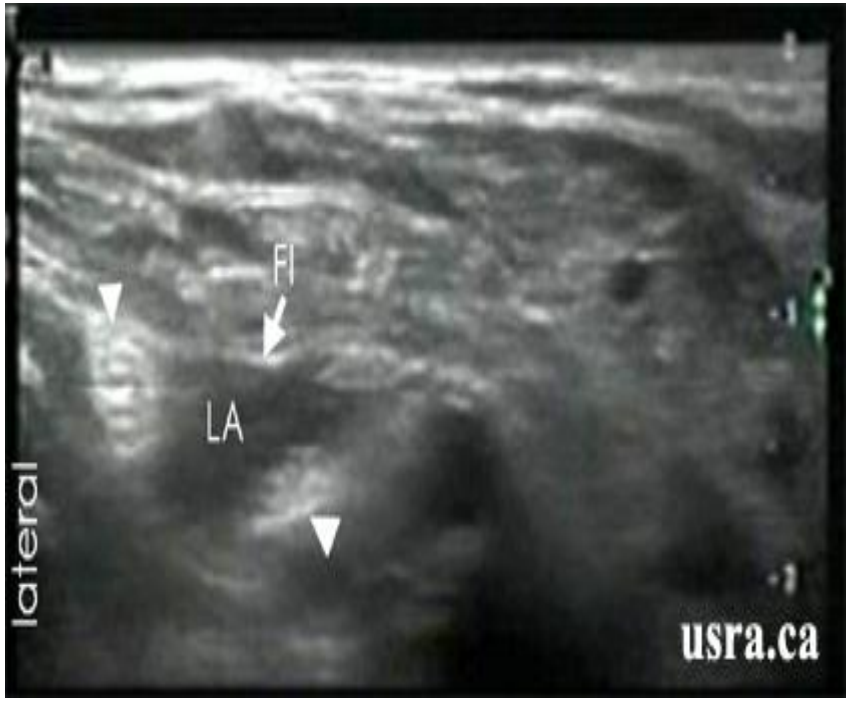
Lokal anestetik enjeksiyonu sonrası





Lokal anestetik enjeksiyonu sonrası





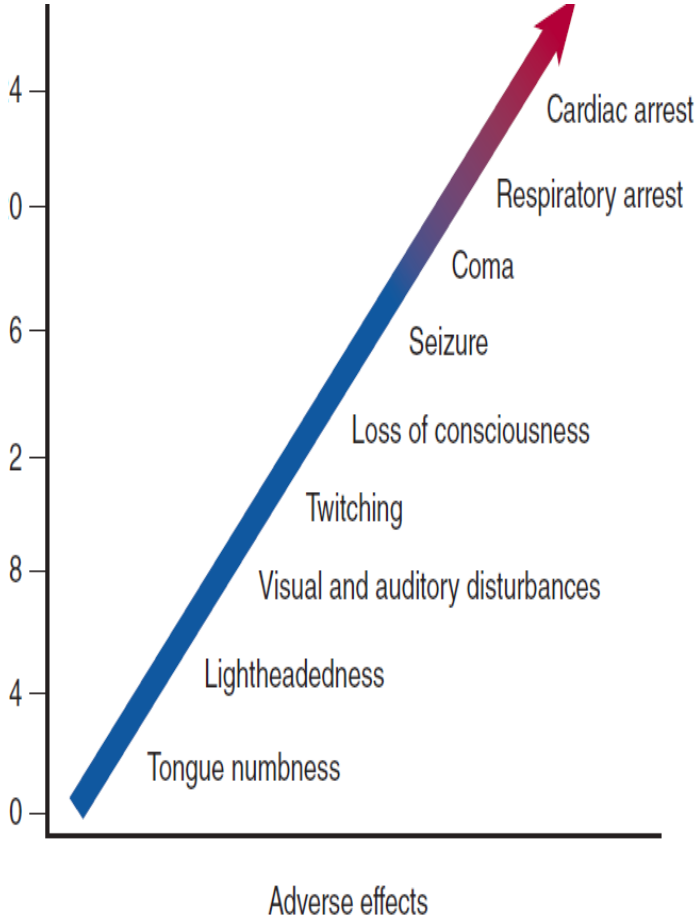
- Enjeksiyon öncesi
- Enjeksiyon sonrası

Anestezinin oluşması

- Anestezi birkaç dakikada başlar
  - İlk kaybolan ağrı ve ısı hissi
  - Ardından dokunma, basınç ve motor
- Uygun yere yapılmamışsa gecikebilir
- Bloğun başarısız olduğuna karar vermeden önce 20-30 dak beklenmeli

Lokal Anestetik Sistemik Toksisite

- Kulak çınlaması, ağızda metalik tat, dudaklarda uyuşma,
- göz kapakları ve dudaklarda seğirme ve nöbet
- Solunum ve santral sinir sistemi depresyonu ve kardiyovasküler arrest



Komplikasyonlar

- Periferal sinir yarlanması;
- İğneye bağlı direkt travma, keskin ağrı
- Sinire yanlışlıkla enjeksiyon, enjeksiyonu sonlandır
- Yüksek basınçlı enjeksiyon
- Sinir hasarı 7-14 güne kadar belirginleşmez
- Sürekli parestezi, ağrı, duyu veya motor defisit
- Tedavisi önlemdir

Komplikasyonlar

- Genellikle zayıf teknikten kaynaklanır
  - El ve bilekte % 1'den az
  - Aksiller % 10
- Nörit ve sinirin inflamasyonu = En sık
- İntravasküler enjeksiyon
- Hematom
- Enfeksiyon
- Kol-bacakta fonksiyon kaybı = Nadir

Evidence Basis for Ultrasound Guidance for Lower-Extremity Peripheral Nerve Block
Update 2016

Francis V Salinas, MD

Abstract: This article reviews and summarizes randomized controlled studies that have investigated ultrasound guidance (USG) for lower-extremity peripheral nerve blocks in comparison with other peripheral nerve localization techniques and those that compared different ultrasound-guided techniques investigating optimal perineural local anesthetic distribution patterns.

Thirty-four studies met the inclusion criteria (minimum Jadad score 3), and 10 additional studies directly compared USG with peripheral nerve stimulation, and 5 additional studies directly compared USG with landmark-based field blocks. Fourteen studies compared different local anesthetic distribution parameters.

Analysis of the literature supports the use of USG for decreased block performance time, decreased block onset time, increased rate of complete sensory block, and increased analgesic efficacy. Ultrasound was never inferior to peripheral nerve stimulation. The research focus has evolved during the last 5 years into investigating optimal ultrasound-guided techniques.

(*Reg Anesth Pain Med* 2016;41: 261–274)

This review aims to critically analyze and update the evidence for ultrasound guidance (USG) as compared with alternative methods of peripheral nerve localization for lower-extremity peripheral nerve blocks (PNBs). Traditionally, the alternative techniques for lower-extremity peripheral nerve localization have included peripheral nerve stimulation (PNS), loss of resistance, and landmark-based field blocks. In the initial evidence-based review of USG for lower-extremity PNBs published in 2010,[1] no studies were designed to assess "block success" when defined as surgical anesthesia. However, the 11 randomized controlled trials (RCTs) analyzed provided level Ib evidence for a grade A recommendation (Table 1) that USG provided outcome benefits. These benefits included a decrease in block onset time (BOT), a decrease in block performance time (BPT), an increased success of sensory block, and a decrease in local anesthetic requirements.[1]

In the last 5 years, USG has become the predominant technique for peripheral nerve localization.[2,3] The research focus has evolved from comparative studies on USG versus traditional peripheral nerve localization techniques to predominantly comparative studies investigating different ultrasound-guided injection techniques and, in particular, studies investigating optimal local anesthetic perineural distribution patterns.[4] Thus, this review will also critically analyze and summarize the evidence-based outcomes comparing different local anesthetic perineural distribution techniques. Lastly, RCTs directly comparing the outcomes of USG (as the sole peripheral nerve localization technique) compared with a combined USG and PNS (USG + PNS) technique will also be reviewed.

METHODS

The National Library of Medicine's MEDLINE database was searched for the period from November 2009 to June 2015. Search strategies included the terms "ultrasound" and "peripheral nerve block." Two-stage searches were also performed using additional key words to capture studies not additionally identified including the terms "ultrasound" with "lumbar plexus," "3-in-1," "fascia iliaca," "femoral nerve," "adductor canal," "saphenous nerve," "lateral femoral cutaneous nerve," "obturator nerve," "sacral plexus," "sciatic nerve," "popliteal block," and "ankle block."

The author assessed whether articles met the following predefined inclusion criteria: RCTs directly comparing USG (as the primary technique with or without concurrent PNS) with PNS, loss of resistance, or landmark-based field block techniques for single-injection and continuous lower-extremity PNBs in adult (older than 18 years) patients. A single large retrospective case series was included because it was the best available clinical (nonvolunteer) evidence for the use of USG when performing ankle blocks. The RCT inclusion criteria for this updated review required a minimal Jadad score[5] of 3, with an appropriate sample size calculation based on the primary outcome of interest. Two RCTs[6,7] in the initial review had Jadad scores less than 3. Randomized controlled trials directly comparing USG + PNS with USG alone were also included to define the advantages and disadvantages of each technique. Randomized controlled trials directly comparing different ultrasound-guided techniques (such as short-axis in-plane [SAX-IP] vs long-axis in-plane [LAX-IP]) for peripheral nerve localization and differences in local anesthetic perineural distribution patterns (such as circumferential vs not; and extraepineural vs subepineural for popliteal sciatic nerve blocks) were also included to define the outcome benefits for these more recently described ultrasound-guided techniques. Studies investigating the minimum local anesthetic volume or concentration requirements were not included. References from eligible articles were manually searched to identify studies not found in the electronic search. Only English language articles were included in the evidence-based review. Studies on the evidence for USG for lower-extremity pediatric PNBs and evidence for safety are addressed in separate evidence-based reviews (Fig. 1).

For the purpose of this review, the primary outcomes of interest included BOT, BPT, total anesthesia-related time (ART = BOT + BPT), postoperative analgesic efficacy (reported pain scores, rescue systemic analgesic requirements, and local anesthetic consumption) of continuous peripheral perineural infusions, analgesic efficacy in hip fractures (pain associated with positioning for spinal anesthesia), and "block success." Block success was defined differently across various studies; definitions included the rate of complete sensory anesthesia (to either pinprick or cold sensory testing) and/or rate of complete motor block,

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- Çevre dokuların,
- İğne ucunun gerçek zamanlı görülmesi,
- Komplikasyonların en aza, başarının maksimuma çıkarılması,
- Hasta başında ve radyasyon riski olmayan.

Kaynaklar

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