

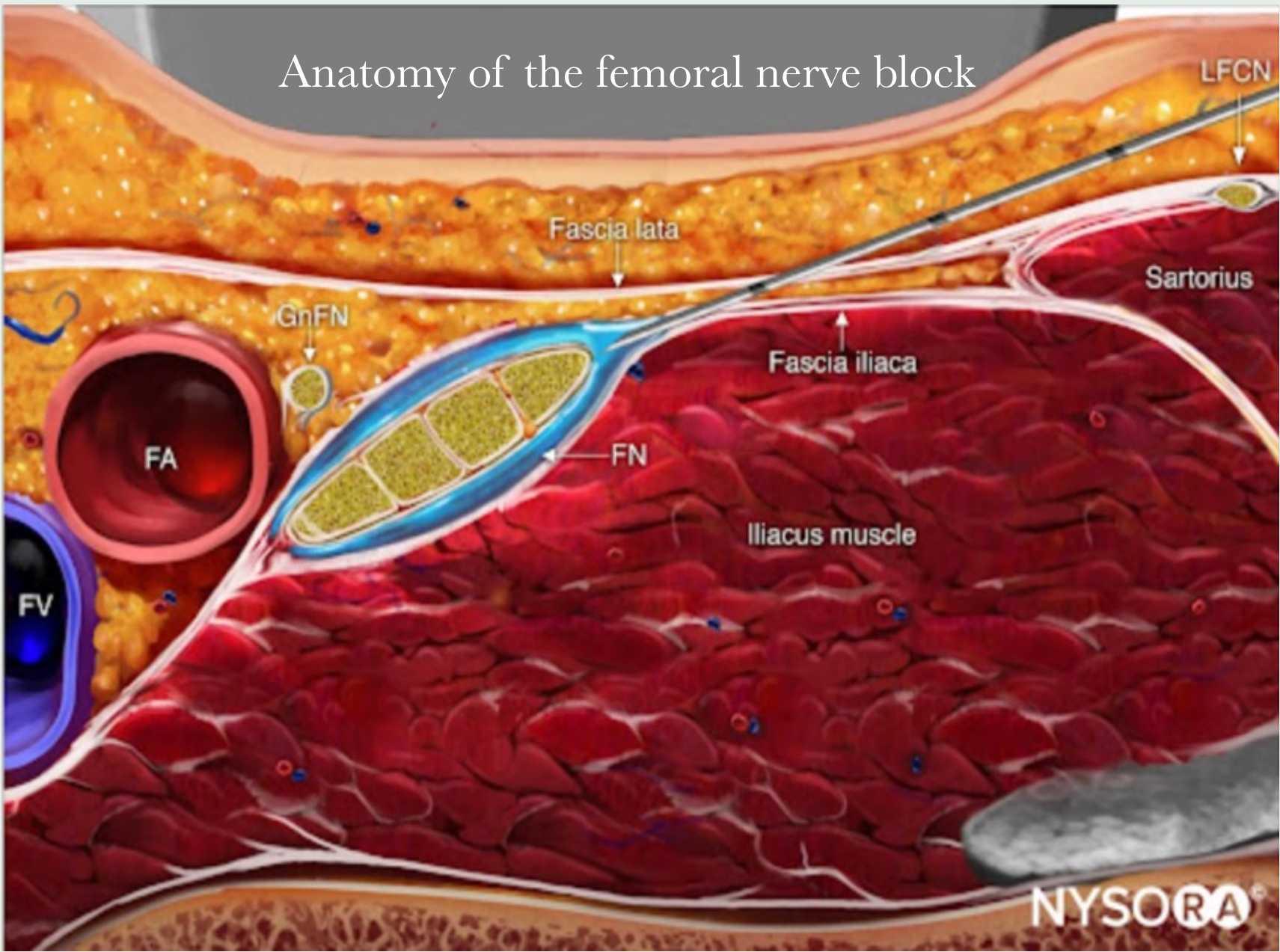
Bespoke Anesthesia to Avoid Post-Operative Cognitive Decline: A Combination of Regional and Total Intravenous Anesthesia

Susanna Hamsley MS¹, Alexander Nowicki MD^{1,2}, Natalie Williams MD³, Christopher Parker-Rajewski MD¹, Stuart Lazarov MD¹
Anesthesiology¹, University of Tennessee Health Science Center, Memphis, TN; Pain Medicine², Emory School of Medicine, Atlanta, GA; STAR Nowicki Clinic³, Nashville, TN



Introduction

The surgical population is steadily aging; with ever increasing comorbidities and susceptibility to perioperative morbidity and mortality. Patients of advanced age have an increased sensitivity to nearly all anesthetic modalities and suffer from a much larger incidence of cognitive dysfunction. This amongst other physiologic changes of aging, leads to an increase in postoperative dysfunction - particularly with anesthetics of small molecular size.



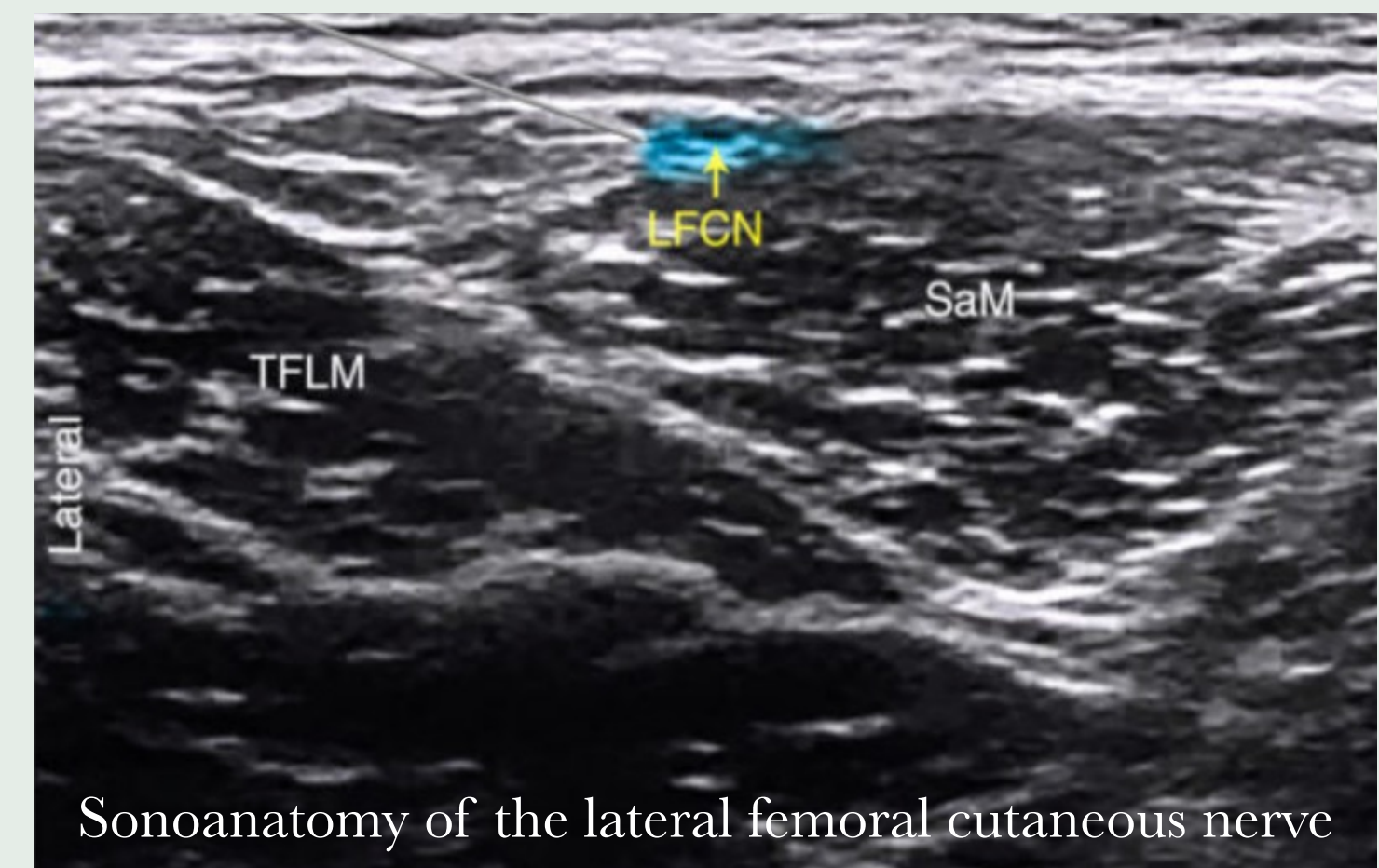
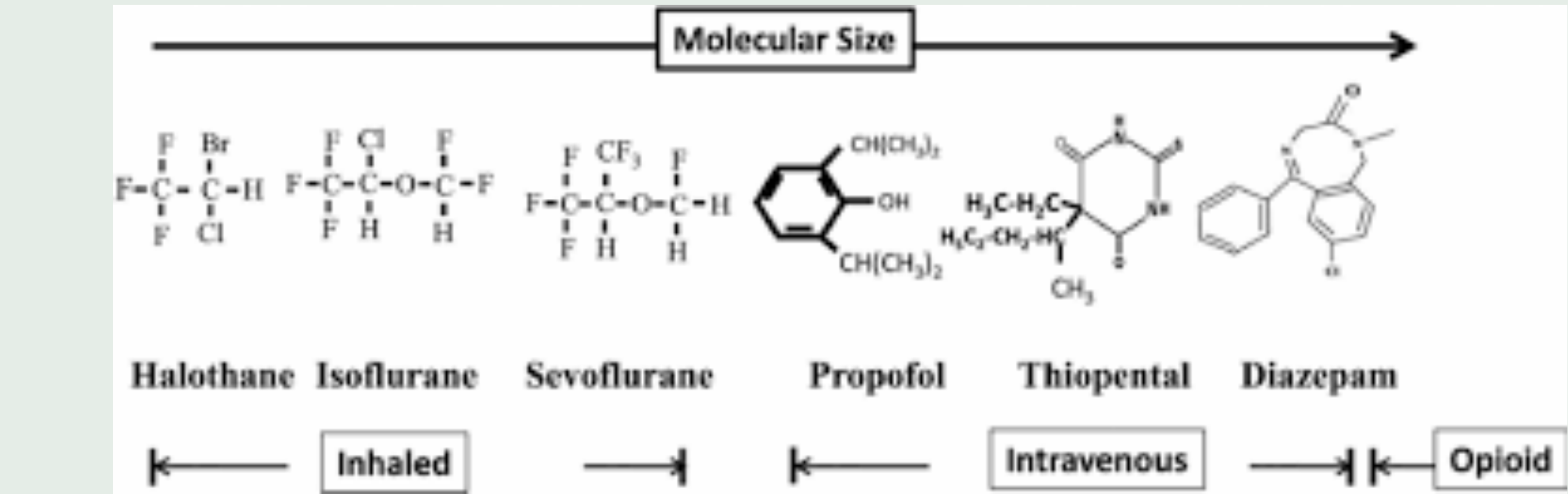
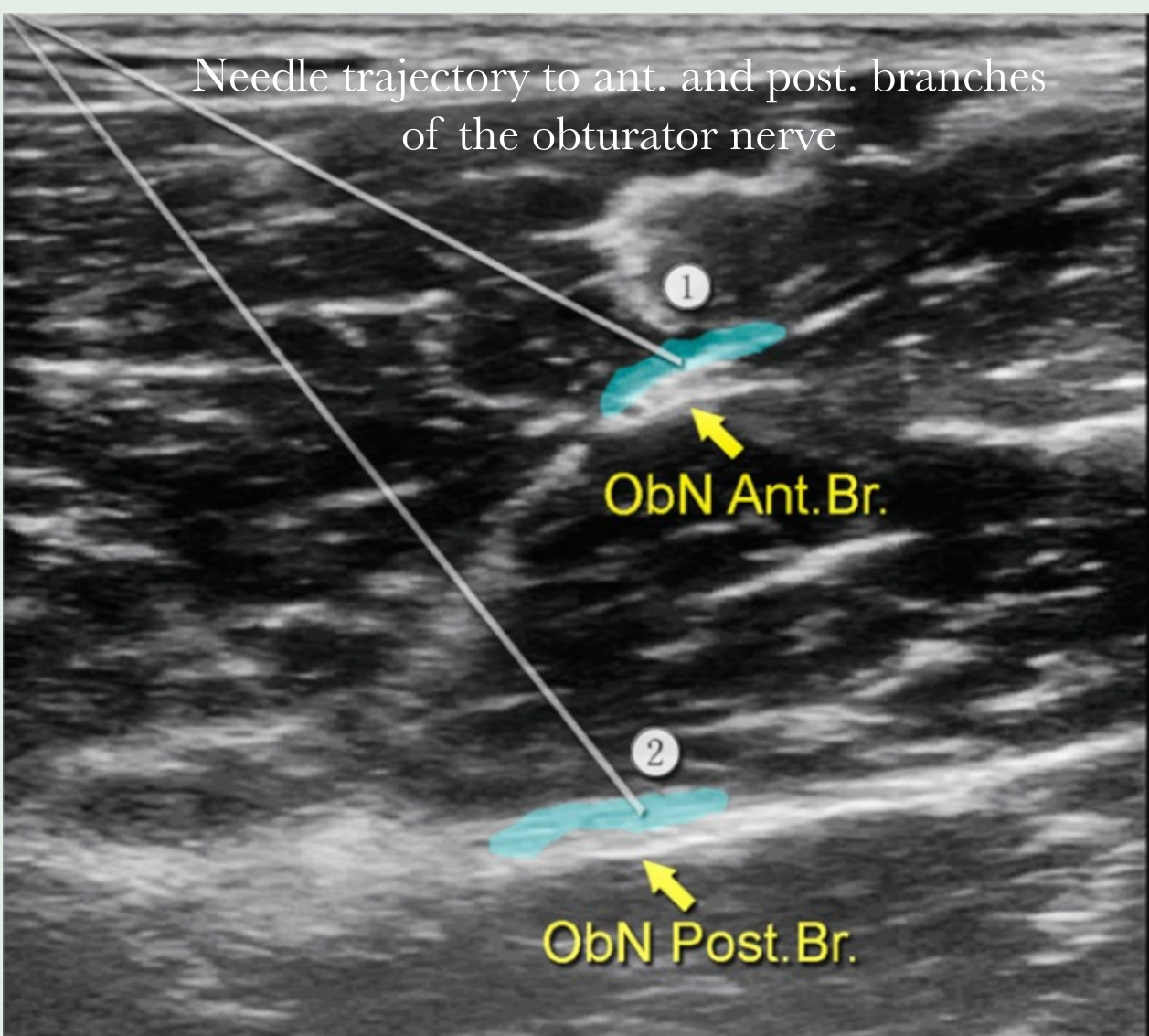
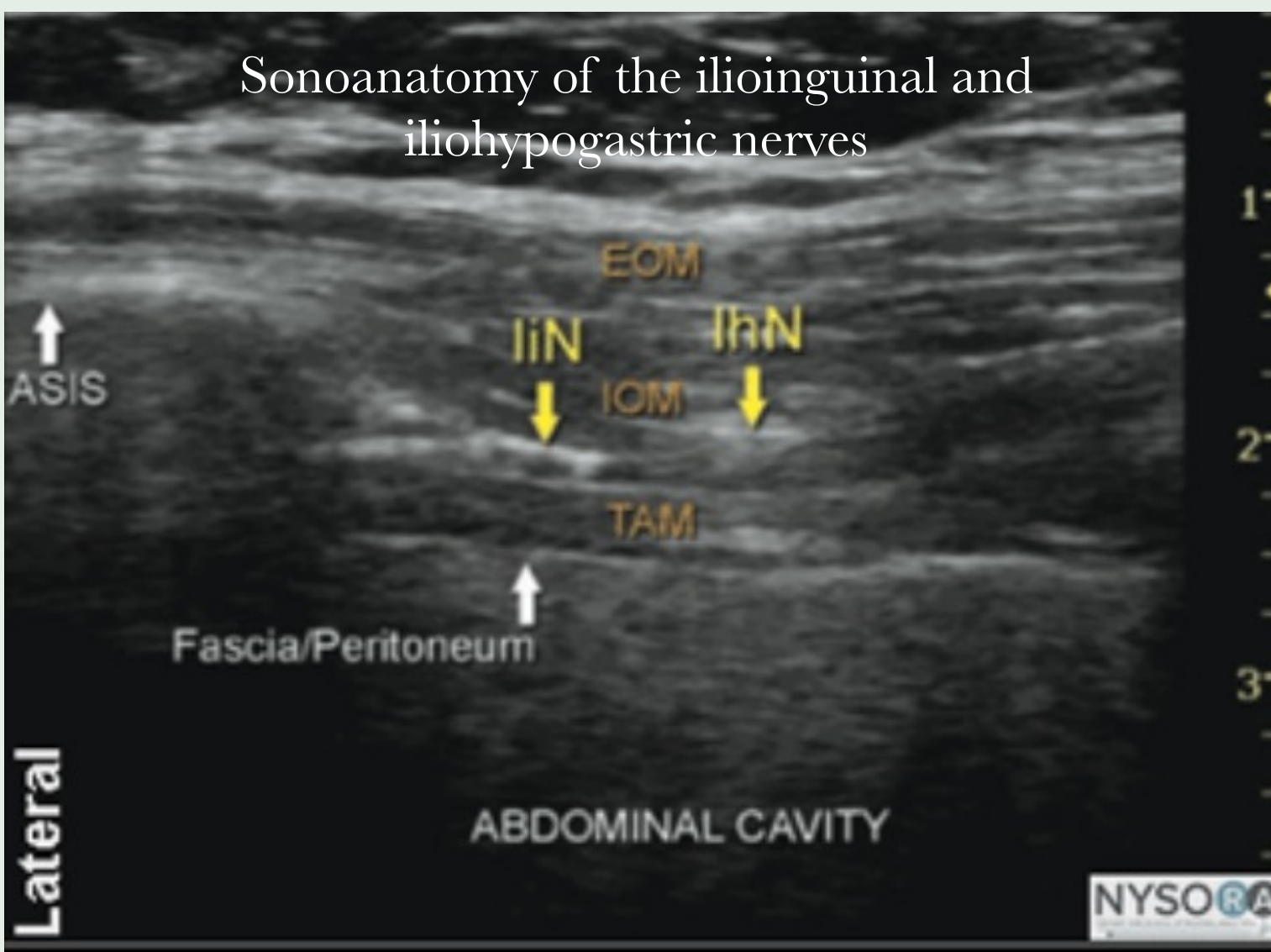
Conclusions

In the U.S., a significant portion of surgical procedures are performed on elderly patients whose preoperative comorbidities increase their susceptibility to perioperative complications [1]. Elderly patients have an increased sensitivity to both inhaled and intravenous anesthetics secondary to changes in both pharmacokinetics and pharmacodynamics, particularly in respect to the functionality of gamma-aminobutyric type A (GABAa), N-methyl-D-aspartate (NMDA), and opioid receptors [2]. When providing care to patients of advanced age, and those susceptible to POCD, it is important to consider what produces the greatest benefits with the lowest potential for harm.

Case Report

An 80F presents to PATs before repeat ORIF right femur for non-union, s/p ORIF for traumatic femur fracture one year prior. She endorsed a personal and familial history of severe postoperative cognitive dysfunction (POCD). After her previous procedure, she experienced an acute episode of short-term memory loss and has no recollection of the week following her anesthetic. Her mother also suffered similar symptoms after an inhaled anesthetic. Extremely hesitant toward GETA, she inquired about options. This was made difficult by a complex PMH: apixaban therapy for multiple severe cardiac arrhythmias, a Hx of multiple TIA's, and surgical sites over multiple anatomical planes and dermatomes. The decision was made to proceed with a combination of 4 peripheral nerve blocks (femoral, ilioinguinal/iliohypogastric, obturator, and lateral femoral cutaneous) in conjunction with a propofol-based total intravenous anesthetic.

After induction, the propofol infusion was initiated and PNBs were performed. She received only 100mcg of fentanyl (induction), maintained low-normal blood pressure, and showed no physiological reactions to surgical stimulation throughout the case. The procedure, anesthetic emergence, and PACU stay were uncomplicated. She showed no signs of delirium or POCD in either immediate post-operative period nor at 1, 3, 6, or 9 months post-operatively. To our knowledge, the patient remains at her preoperative baseline without any complaints of post operative cognitive dysfunction.



In this case, we chose to use anesthetics with larger molecular structures to decrease penetration of the blood brain barrier (BBB), thus decreasing the likelihood of POCD. It is presumed that by decreasing the amount of anesthetic which crosses the BBB, we will decrease the oligo-polymerization of β -amyloid and other native proteins and peptides alike. This may subsequently result in fewer adverse effects and be an essential portion of preventing long-term postoperative cognitive decline, which may be in large part secondary to the use of anesthetics with smaller molecular makeup, such as volatile anesthetics. A recent meta-analysis reviewed seven studies and concluded that TIVA potentially reduces the risk of POCD compared to General Anesthesia with a significant odds ratio of 0.52 [3], supporting the positive outcomes seen in this patient. With an ever-aging population and increased incidence of surgical procedures in patients of advanced age, it is the opinion of these authors that consideration of alternative methods may be of paramount and life altering importance in the prevention of postoperative cognitive dysfunction in this at-risk patient population.

Materials & Methods

Patient consent was obtained, and no identifiable patient information used.

References

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