Pre-operative Lumbar Plexus Block Provides Superior Post-operative Analgesia when compared with Fascia Iliaca Block or General Anesthesia alone in Hip Arthroscopy

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- I have the following financial relationships to disclose:
  - Consultant: Arthrex, Stryker

Background and Rationale

- I perform hip arthroscopy at three different centers with three different anesthesia teams
  - One GA alone
  - One Fascia Iliaca Block + GA
  - One Lumbar Plexus Block + GA
- All insist that their method is the best

Preoperative Femoral Nerve Block in Hip Arthroscopic Surgery

A Retrospective Review of 108 Consecutive Cases

Andrew P. Dold,*† MD, Lucas Murnaghan,‡ MD, Jerry Xing,† MD, Faraj W. Abdallah,§ MD, Richard Brull,‖ MD, and Daniel B. Whelan,¶ MD
Investigation performed at Women's College Hospital, Toronto, Ontario, Canada

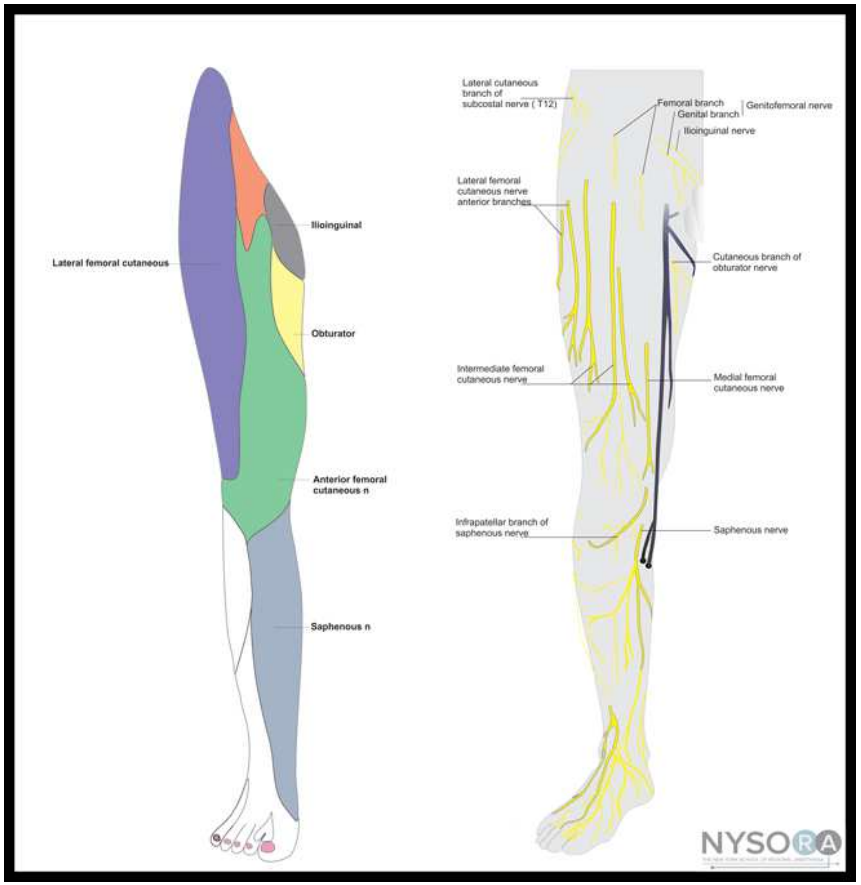
- Compared GA to GA plus femoral nerve block
- Statistically significant decrease in PACU pain score at 60 min (but not 0, 15, 30, 45 mins)
- Statistically lower morphine equivalent doses in PACU and intra-op
- No difference in nausea/vomiting
- No difference in oxycodone use in SDCU
- No difference in time to discharge from PACU

Hip Innervation

- The hip joint is innervated by the femoral nerve, obturator nerve, the sacral plexus via the nerve to the quadratus femoris, and at times, directly via the sciatic nerve [1]

- The anterior portion of the hip joint is innervated by the Femoral and Obturator Nerves

- The anterolateral thigh is innervated by the Lateral Femoral Cutaneous Nerve



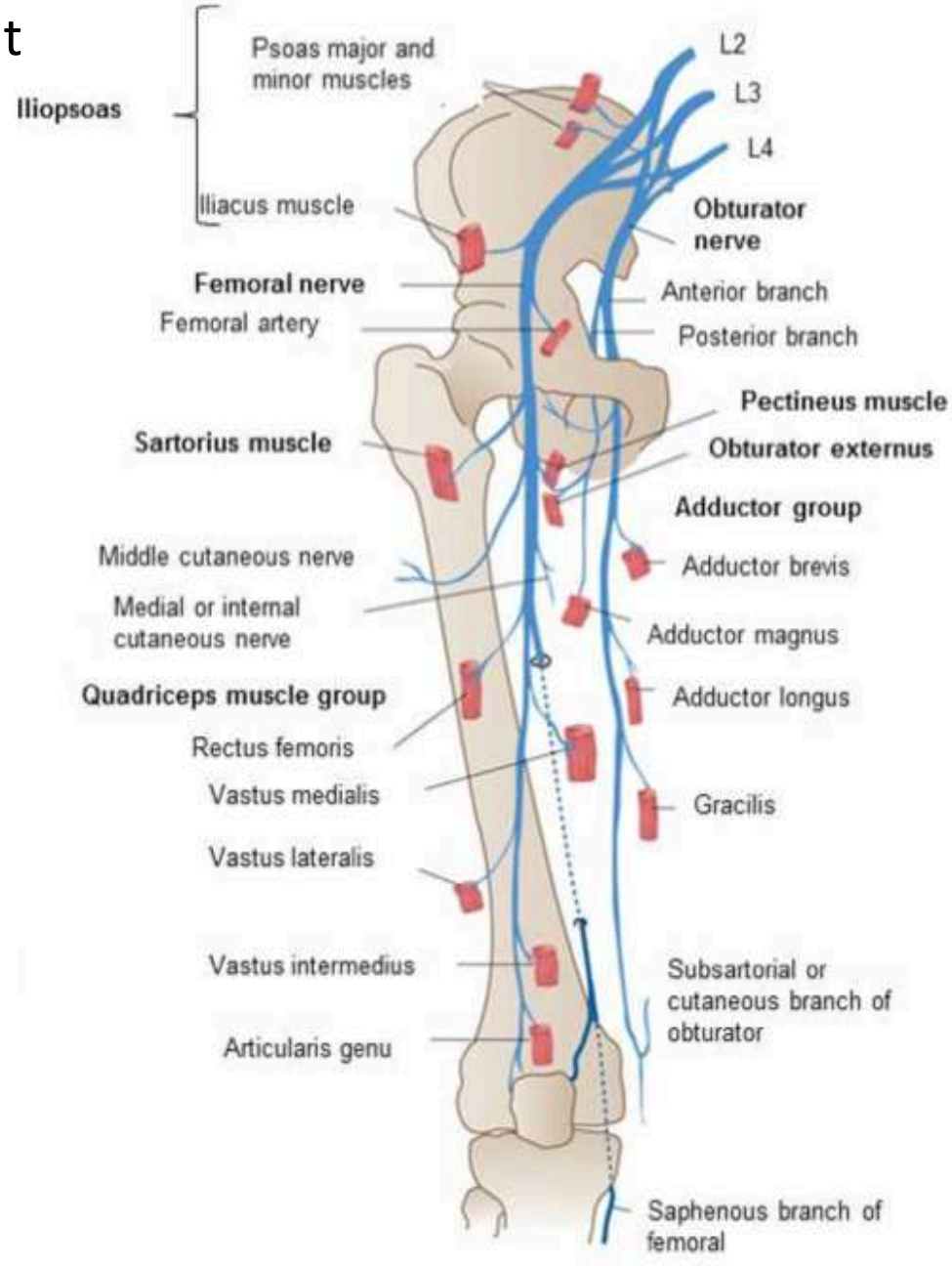
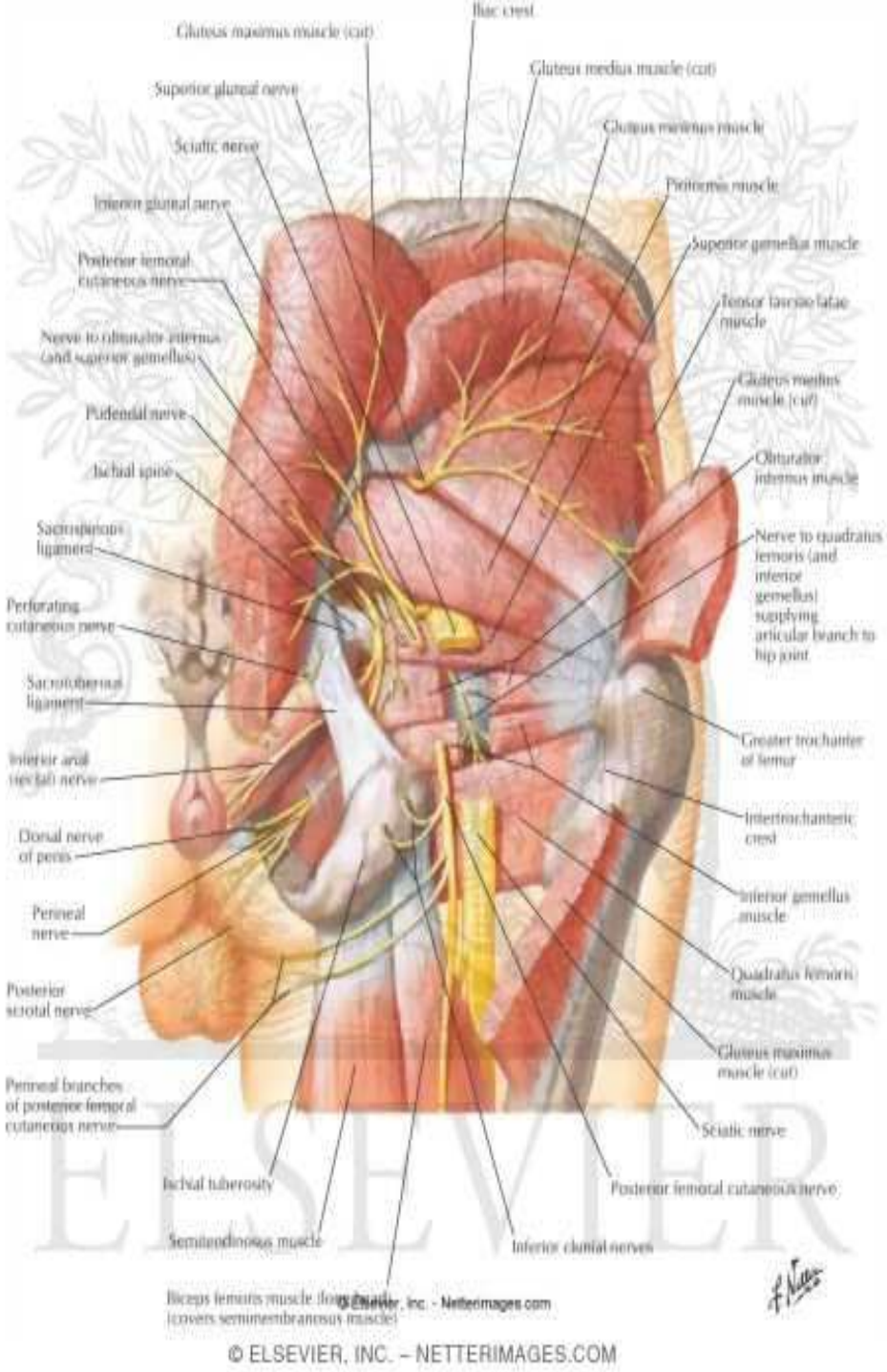


Figure 28-11 . The femoral and obturator nerves. In: Waxman SG. *Clinical Neuroanatomy*. 26th ed. New York, NY: McGraw-Hill; 2010.

- The posterior portion of the hip joint is innervated by the:
  - Nerve to the Quadratus Femoris
  - The Superior Gluteal Nerve
  - Directly via the Sciatic Nerve



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Fascia Iliaca Block

- Provides Femoral and Lateral Femoral Cutaneous Nerve blockade

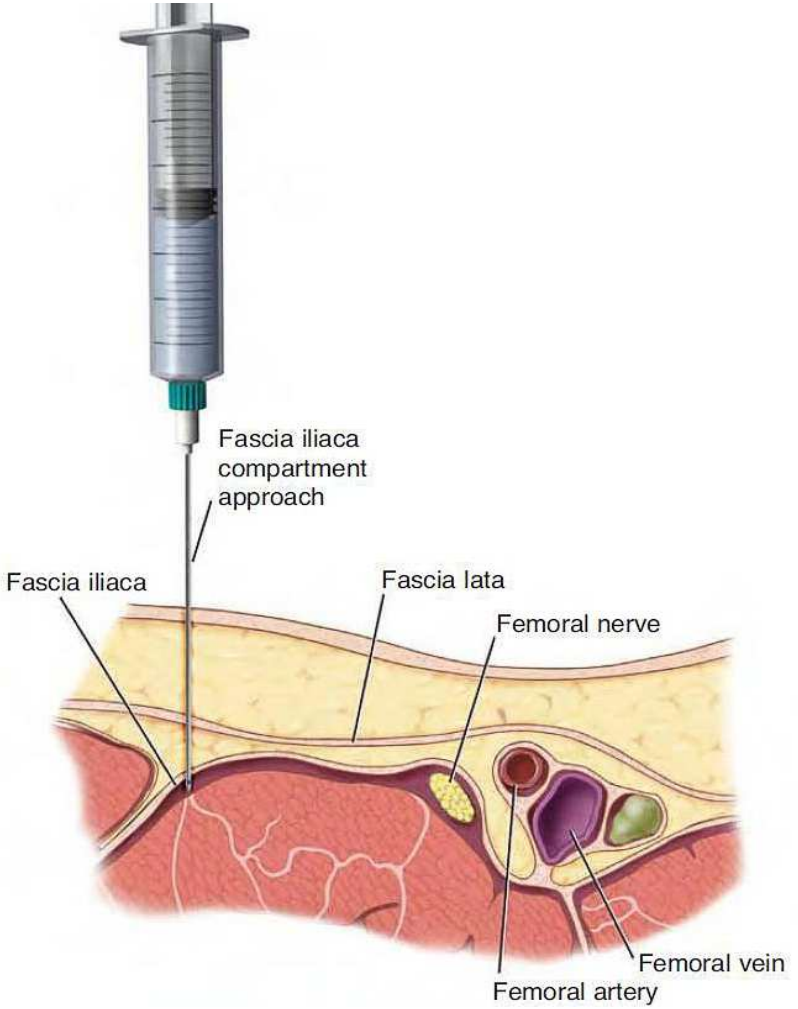


Image from Portmouth Anaesthesia accessed 10/6/14. http://usfa.co.uk/?p=85

Materials and Methods

- Retrospective chart review
- 84 consecutive patients who underwent arthroscopic hip surgery
- Single surgeon
- Single ambulatory surgery center
- Single anesthesiologist

Materials and Methods

- Single anesthesiologist performed all pre-operative fascia iliaca blocks under ultrasound
- Goal is a medial to lateral spread of local anesthetic underneath the fascia iliaca.

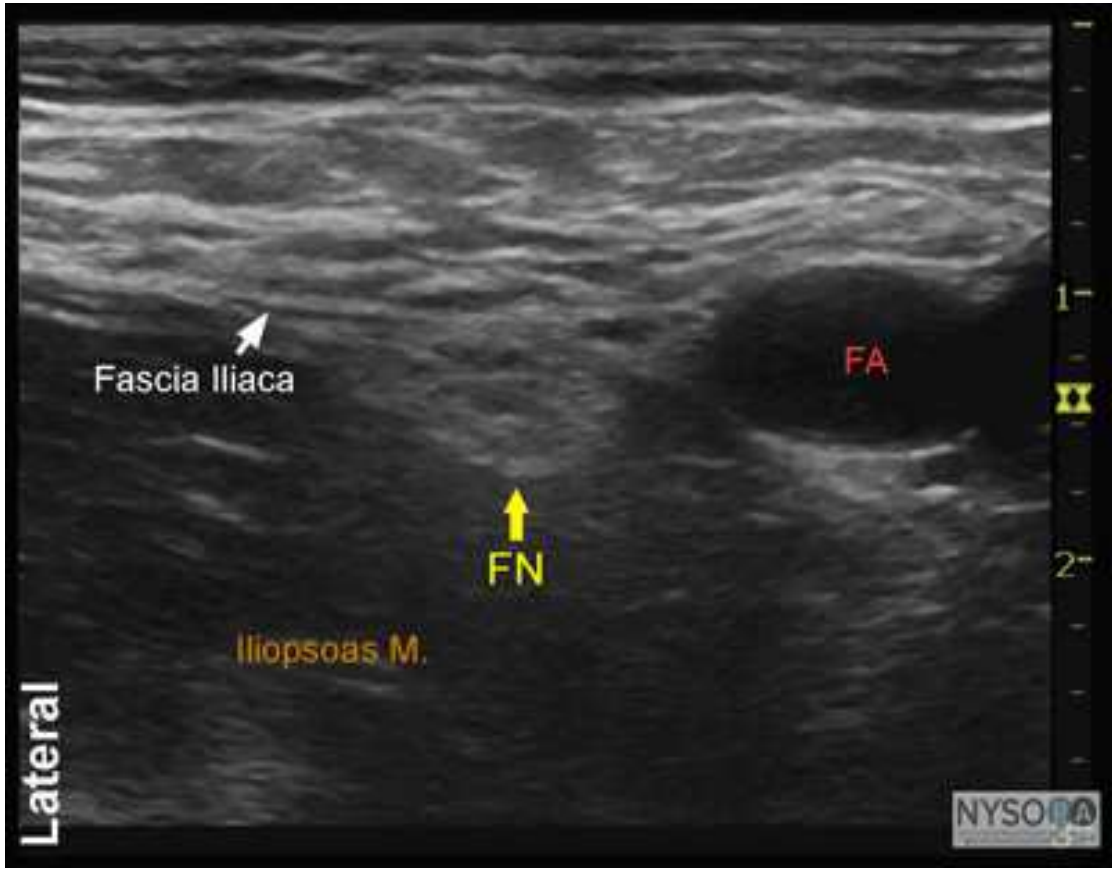


Image from www.nysora.com accessed 10/9/14.

Materials and Methods

- The local anesthetic used is 40 mL 0.2% Ropivacaine with 4 mg of preservative free Decadron
- Post-op knee immobilizer used due to Femoral Nerve motor blockade

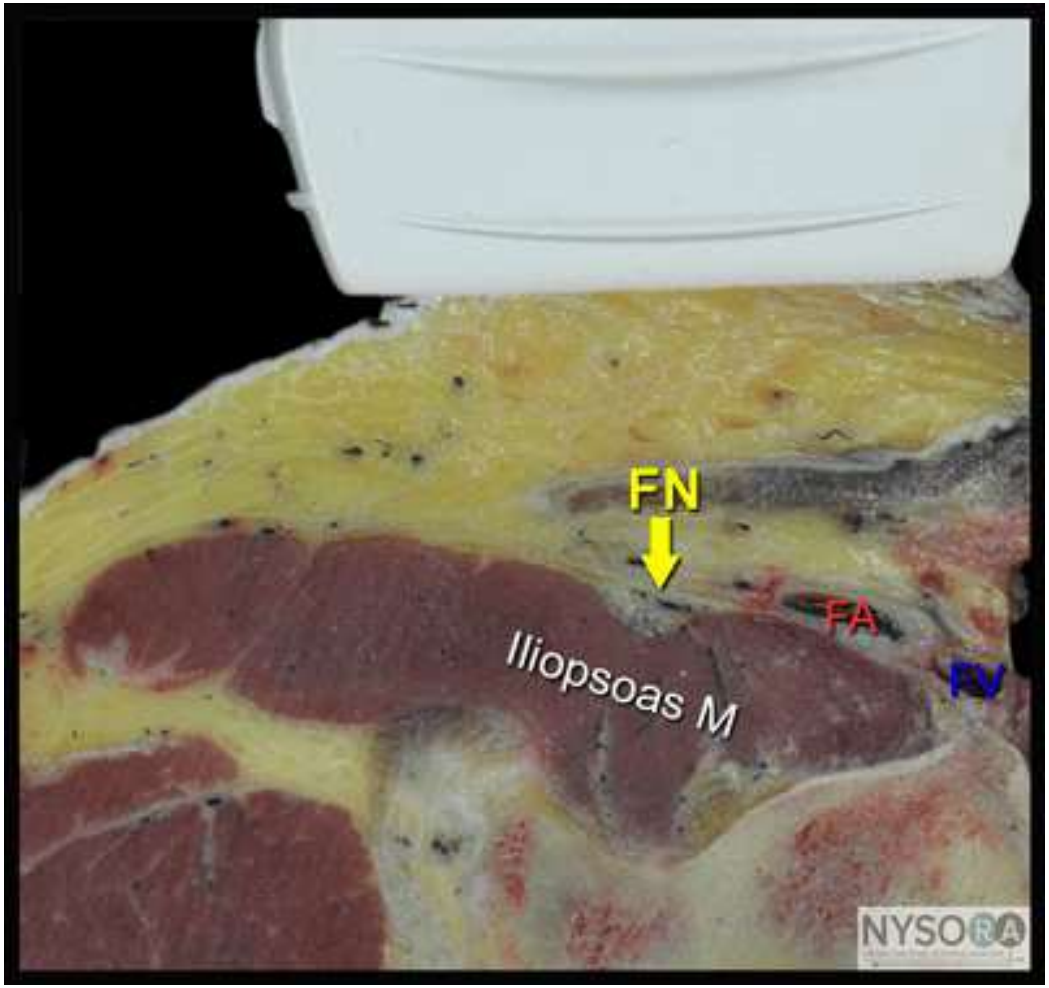


Image from www.nysora.com accessed 10/9/14.

Materials and Methods

- The first 55 procedures performed under general anesthesia alone

- The subsequent 29 procedures underwent a fascia iliaca block prior to general anesthesia.

Materials and Methods

- Groups were compared with respect to:
  - Gender
  - Age
  - Procedure performed
  - Pain scores (0-10 scale) recorded at 0, 30, 60, 90 and 120 minutes postoperatively in the post-anesthesia care unit (PACU)
  - Total morphine-equivalent dose in the PACU
  - Time to discharge
  - Presence of nausea in the PACU requiring anti-emetic medication
  - Ambulatory status at the time of discharge.

Materials and Methods

- Groups were compared against one another using a two-tailed, unequal sample size and unequal variance independent sample Student's t-test with regards to demographic and postoperative data.
- For the data analysis in this study, a p-value less than 0.05 was determined to be statistically significant signifying that a difference between the two experimental groups exists.

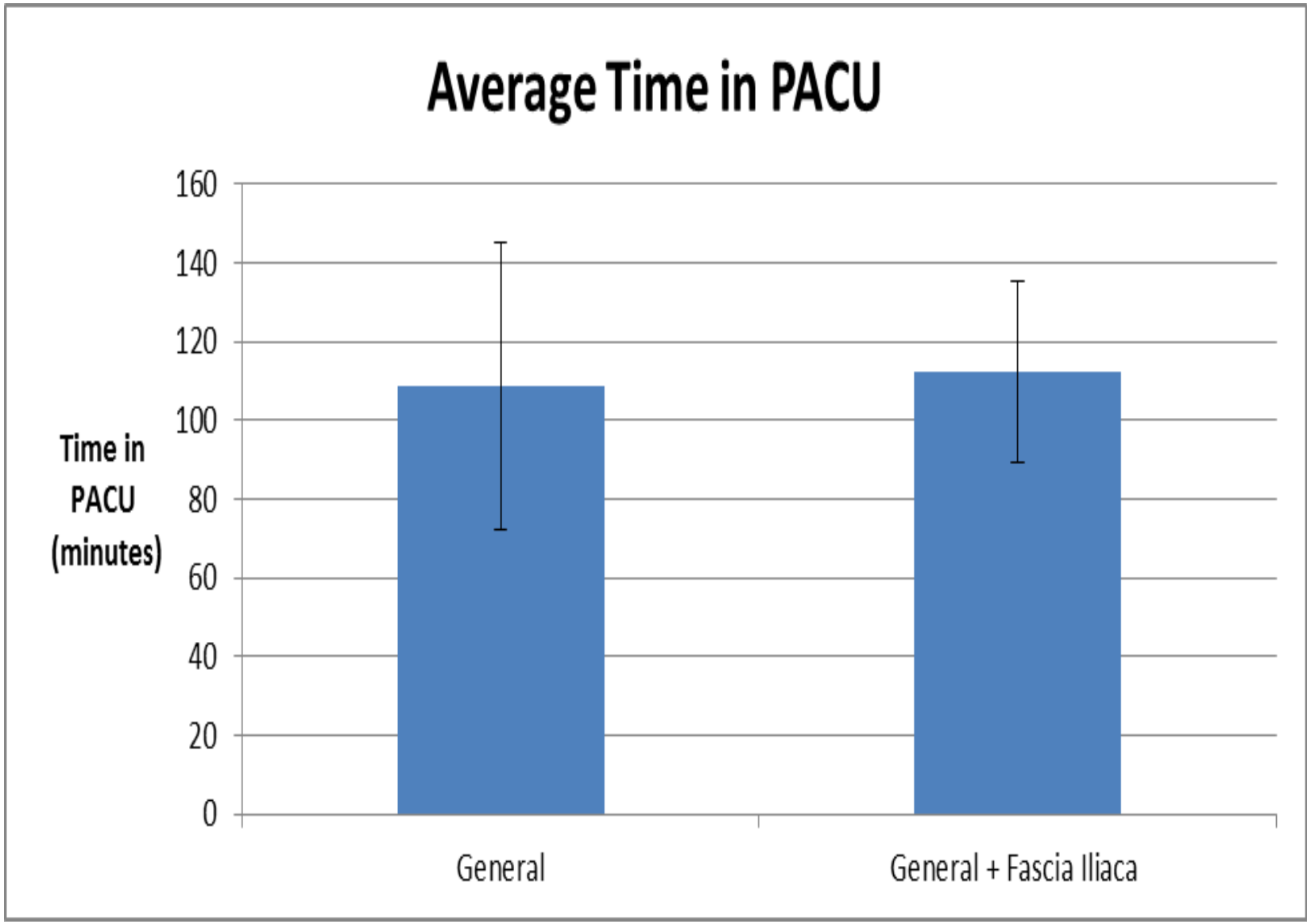
Results

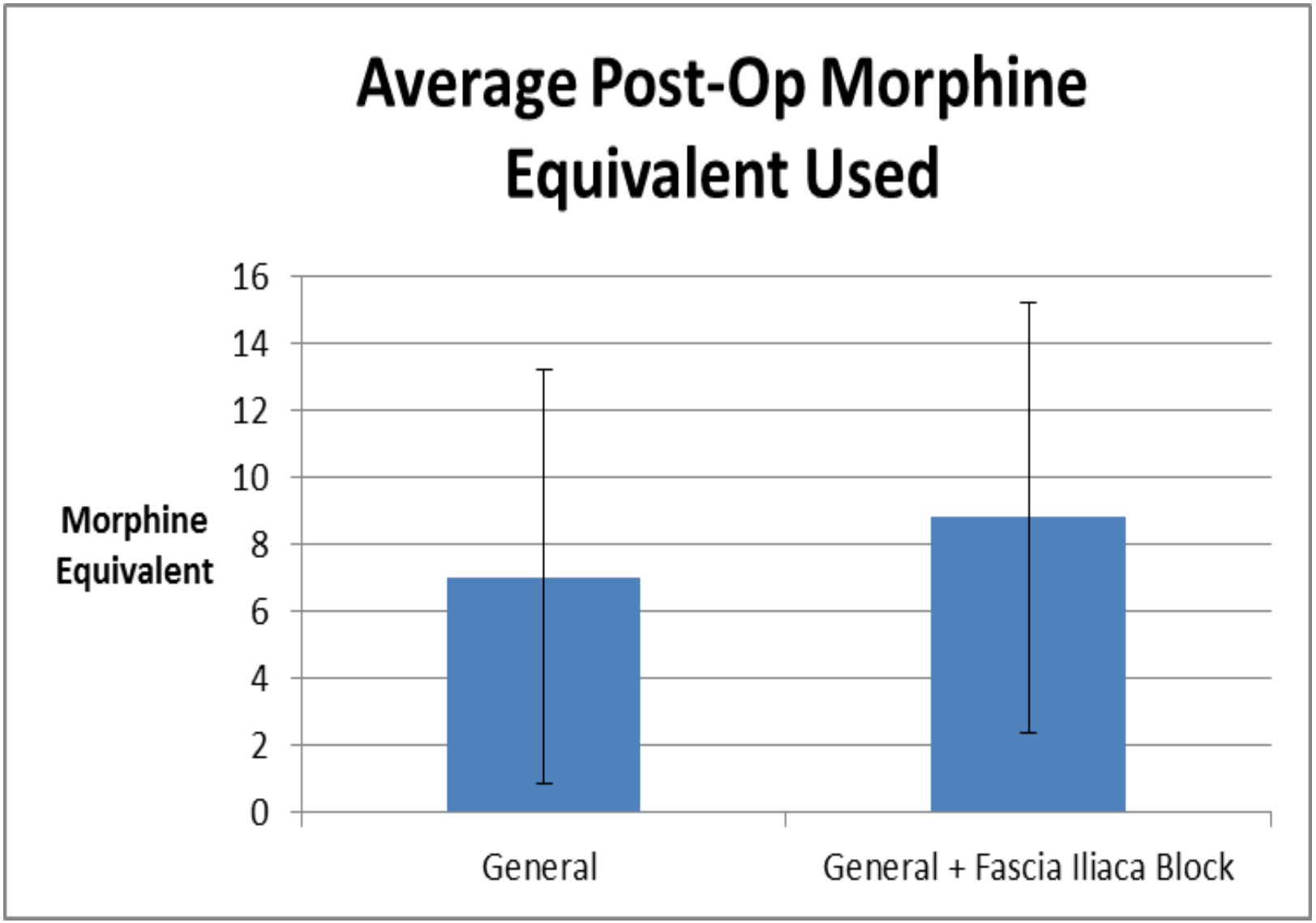
	Group 1 (n = 55)	Group 2 (n = 30)
Age a) Average b) Standard Deviation c) p-value	a) 34.51 b) 11.52 c) p = 0.14	a) 30.17 b) 13.51 c) p = 0.14
Sex a) Breakdown b) p-value	a) Male = 18, Female = 37 b) p = 0.72	a) Male = 11, Female = 19 b) p = 0.72
Cam Osteoplasty a) Number Performed (%) b) p-value	a) n = 47 (85%) b) p = 0.12	a) n = 21 (70 %) b) p = 0.12
Pincer Osteoplasty a) Number Performed b) p-value	a) n = 23 (42%) b) p = 0.28	a) n = 9 (30%) b) p = 0.28
Labral Repair a) Number Performed b) p-value	a) n = 33 (60%) b) p = 0.049	a) n = 24 (80%) b) p = 0.049
Labral Reconstruction a) Number Performed b) p-value	a) n = 18 (33%) b) p = 0.034	a) n = 4 (13%) b) p = 0.034
Capsular Plication a) Number Performed b) p-value	a) n = 32 (58%) b) p = 0.20	a) n = 13 (43%) b) p = 0.20
Gluteus Medius/Minimus Repair a) Number Performed b) p-value	a) n = 0 (0%) b) p = 0.33	a) n = 1 (3%) b) p = 0.33
Labral Debridement a) Number Performed b) p-value	a) n = 6 (11%) b) p = 0.50	a) n = 2 (7%) b) p = 0.50

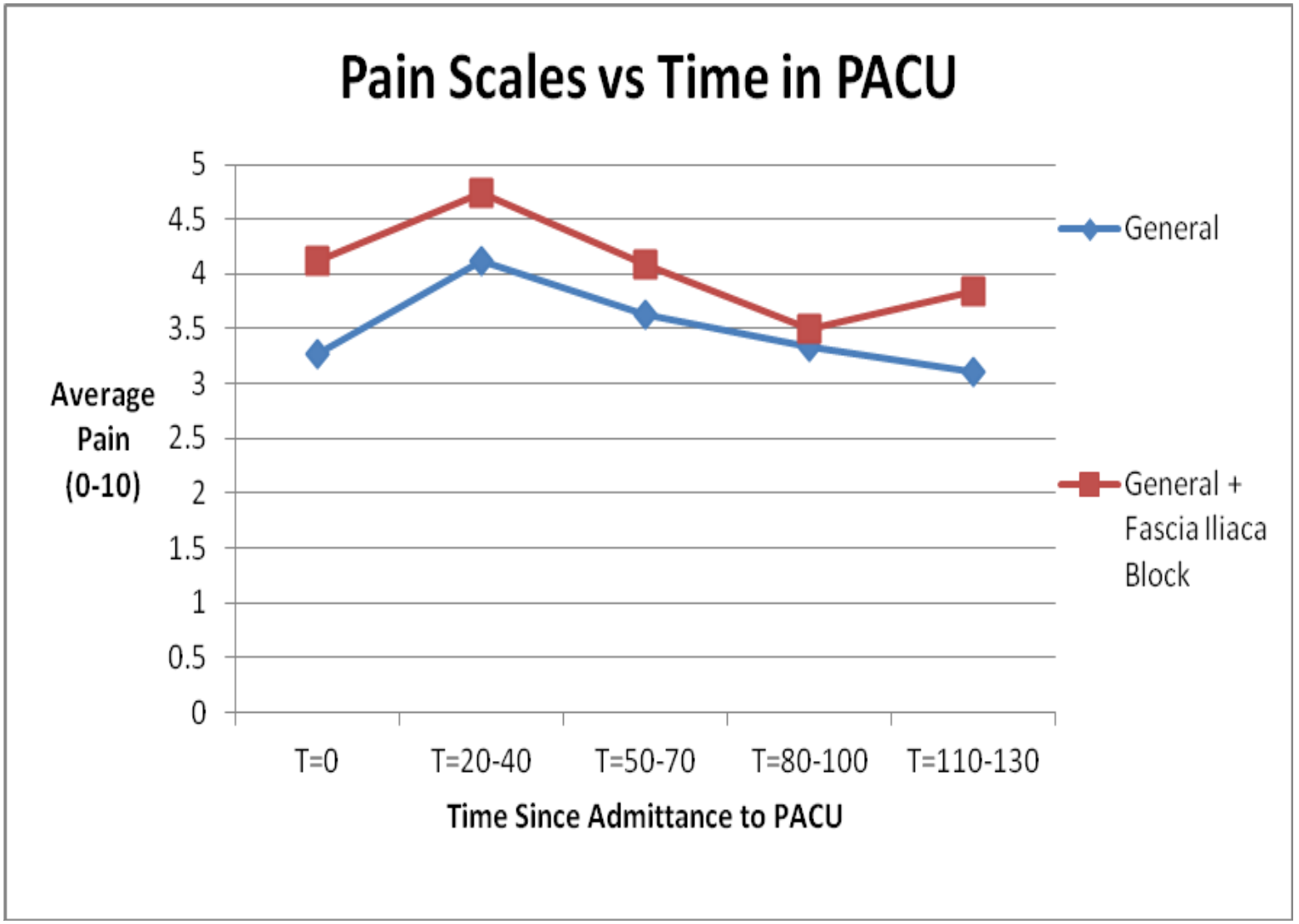
Table 1: Data pertaining to demographics and procedure performed.

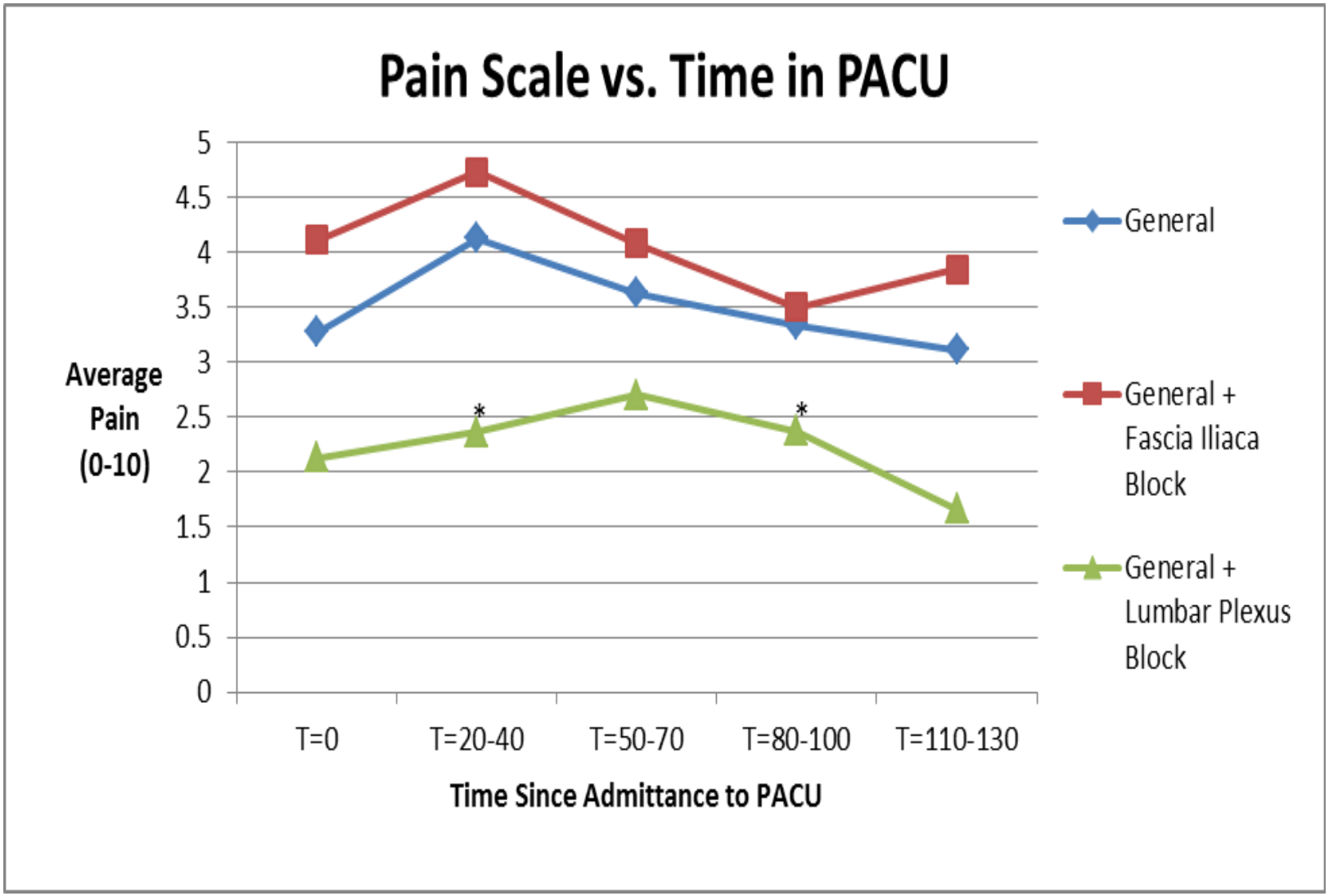
Results

- No complications in either group


Average Time in PACU
Time in PACU (minutes)
160
140
120
100
80
60
40
20
0
General
General + Fascia Iliaca


Average Post-Op Morphine Equivalent Used
Morphine Equivalent
16
14
12
10
8
6
4
2
0
General
General + Fascia Iliaca Block


Pain Scales vs Time in PACU
Average Pain (0-10)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
T=0
T=20-40
T=50-70
T=80-100
T=110-130
Time Since Admittance to PACU
General
General + Fascia Iliaca Block


Pain Scale vs. Time in PACU
Average Pain (0-10)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
*
*
T=0
T=20-40
T=50-70
T=80-100
T=110-130
Time Since Admittance to PACU
General
General + Fascia Iliaca Block
General + Lumbar Plexus Block

Conclusion

- Femoral Nerve and Lateral Femoral Nerve blockade insufficient to provide meaningfully beneficial changes in post-op pain, nausea, time in PACU, morphine equivalent dosage
  - No blockade of Obturator, Nerve to Quadratus, Sciatic,

- No significant benefit to Fascia Iliaca Block in concert with GA versus GA alone

Conclusion

- Given the extra time, cost, potential risk, consideration should be given to abandoning this for hip arthroscopy

- Promising early results with Lumbar Plexus Block given with GA

Results

	Group 1 (n = 55)	Group 2 (n = 30)
Morphine Equivalents a) Average b) Standard Deviation c) p-value	 a) 7.02 b) 6.18 c) p = 0.22	 a) 8.80 b) 6.41 c) p = 0.22
No Nausea (0) vs. Presence of Nausea (1) a) Average b) Standard Deviation c) p-value	 a) 0.24 b) 0.43 c) p = 0.23	 a) 0.13 b) 0.35 c) p = 0.23
Total Time in PACU (minutes) a) Average b) Standard Deviation c) p-value	 a) 108.58 b) 36.52 c) p = 0.57	 a) 112.23 b) 22.82 c) p = 0.57
Ambulatory Status ** a) Average b) Standard Deviation c) p-value	 a) 0.7 b) 0.40 c) p = 1.00	 a) 0.7 b) .45 c) p = 1.00
Pain Scale at t = 0 min. a) Average b) Standard Deviation c) p-value	 a) 3.25 b) 3.32 c) p = 0.31	 a) 4.12 b) 3.93 c) p = 0.31
Pain Scale at t = 30 min. a) Average b) Standard Deviation c) p-value	 a) 4.10 b) 2.86 c) p = 0.38	 a) 4.72 b) 3.19 c) p = 0.38
Pain Scale at t = 60 min. a) Average b) Standard Deviation c) p-value	**(n = 54)** a) 3.62 b) 2.45 c) p = 0.43	 a) 4.08 b) 2.62 c) p = 0.43
Pain Scale at t = 90 min. a) Average b) Standard Deviation c) p-value	**(n = 37)** a) 3.32 b) 2.27 c) p = 0.75	 a) 3.5 b) 2.19 c) p = 0.75
Pain Scale at t = 120 min a) Average b) Standard Deviation c) p-value	**(n = 18)** a) 3.08 b) 2.06 c) p = 0.40	**(n = 13)** a) 3.85 b) 2.67 c) p = 0.40

Table 4: Postoperative outcomes resulting from hip arthroscopies.
** Wheelchair (0) vs. Wheelchair/crutches (0.5) vs. crutches (1)**

References

- Birnbaum K; Prescher A; Hessler S; Heller K. The Sensory Innervation of the Hip Joint - An Anatomical Study. *Surgical and Radiologic Anatomy*. 1997;19(6):371-5.
- Dold et al. Preoperative Femoral Nerve Block in Hip Arthroscopic Surgery: A Retrospective Review of 108 Consecutive Cases. *Amer J Sports Med* 2013;20(10).
- Monzon et al. Single Fascia Iliaca Compartment Block for Post-Hip Fracture Pain Relief. *J Emer Med* 207;32(3)257-262.
- Anaraki et al. The Effect of Fascia Iliaca Compartment Block Versus Gabapentin on Postoperative Pain and Morphine Consumption in Femoral Surgery, a Prospective, Randomized, Double-Blind Study. *Indian J Pain* 2014;28(2)111-116.
- Mouzopolous et al. Fascia Iliaca Block Prophylaxis for for hip fracture patients at risk for delirium: a randomized placebo-controlled study. *J Orthop Traumatol.*2009;10:127-133.
- Foss et al. Fasicai Iliaca Compartment Blockade for Acute Pain Control in Hip Fracture Patients: a arandomized placebo-controlled study. *Anesthesiology.*2007;106:773-778.
- Fascia Iliaca Block. *The New York School of Regional Anesthesia – NYSORA* 2013.