

Acute Pain Management of a Patient with Multiple Amputations

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BACKGROUND

Each year, 500,000–600,000 limb amputations occur in the U.S., with 2.3 million individuals living with limb loss in 2019, a number projected to reach 3.6 million by 2050. Pain is typically managed using a multimodal approach. Quadruple amputations are rare and pose complex pain management challenges. This report outlines the analgesic strategy used to effectively control intra- and postoperative pain in a patient undergoing all four limb amputations.

Case Report

A 36-year-old pregnant woman (28 weeks gestation) with no relevant past medical history presented on 2/17/24 with abdominal pain and preterm contractions. She rapidly developed hypotension requiring vasopressors and intubation. An emergent C-section revealed placental abruption; labs indicated DIC, and placental cultures were positive for group A Streptococcus. She experienced combined hemorrhagic and septic shock, requiring three vasopressors and massive transfusion.

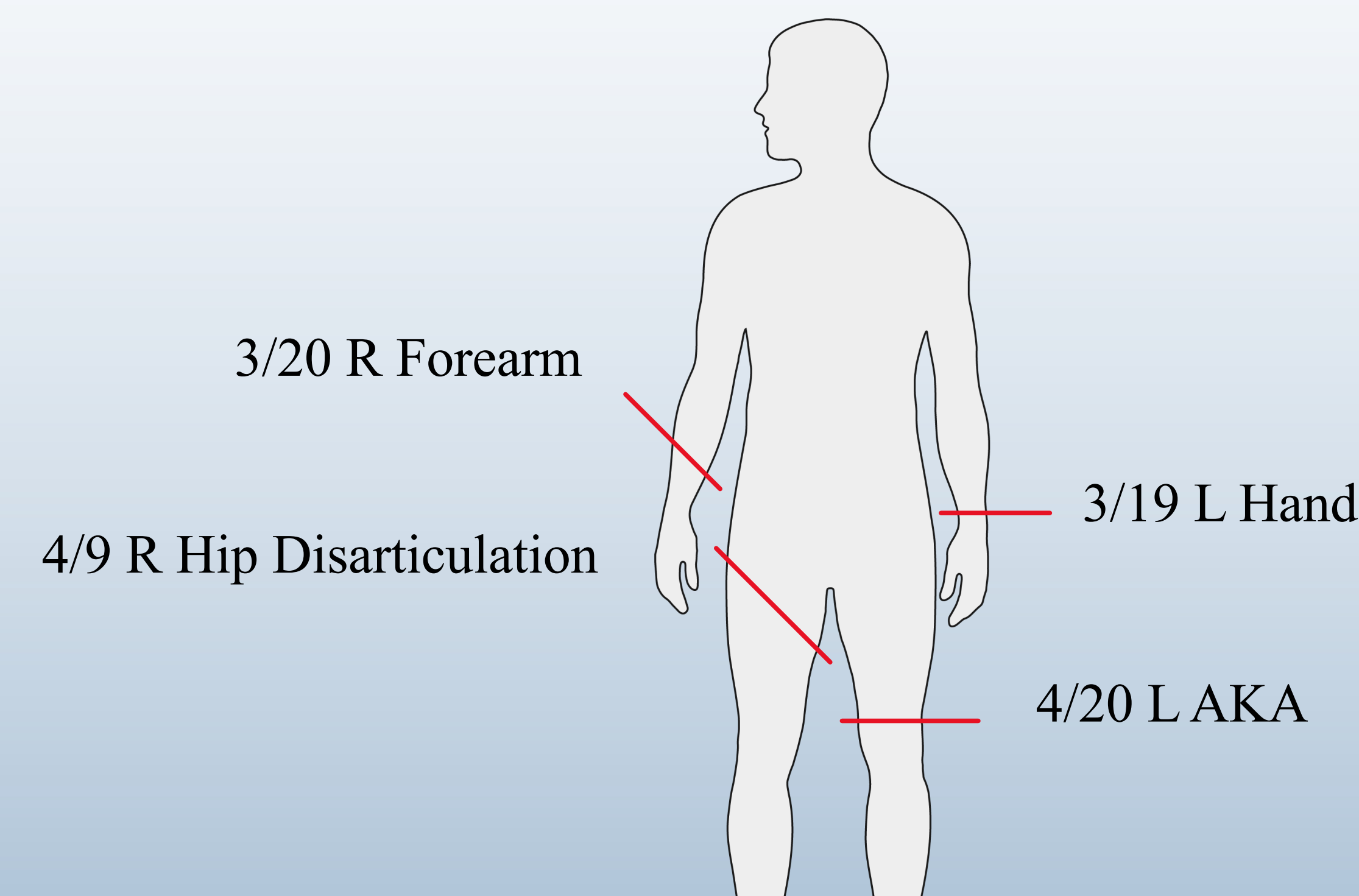
By 2/20/24, she developed distal limb ischemia due to high-dose vasopressors. Vascular surgery recommended amputation. She was extubated, stabilized on one vasopressor, and transferred to KUMC on 2/24/24. Ultimately, she underwent 4 limb amputations. The patient’s hospital course was further complicated by bowel ischemia, which required an exploratory laparotomy and subsequent resection. Additionally, she developed an acute kidney injury and eventual end stage renal disease requiring continuous renal replacement therapy before being transitioned to hemodialysis.

Pain management included pre-operative peripheral nerve catheters (PNCs) with bupivacaine for upper limb amputations, pre-operative lumbar epidurals/PNCs for major lower limb procedures, ketamine, antispasmodic medications, opioids, and pregabalin for neuropathic pain. These modalities were gradually weaned as her condition improved, with careful opioid management. She was discharged on 5/22/24 after skin grafting and continued pain control.

Analgesic Strategy

Date	Plan of Care/ Action	Date	Plan of Care/ Action
3/19	L supraclavicular PNC 2/2 L hand amputation (0.125% bupivacaine @ 8cc/hr)	4/11	INR and TEG w/in normal limits. Lumbar epidural removed
3/20	- R infraclavicular PNC 2/2 R forearm amputation (0.125% bupivacaine @ 5cc/hr) *Both PNCs running at 0.125% @ 5cc/hr*	4/17	L4/5 epidural (bupivacaine 0.0625% @ 8cc/hr) placed 2/2 increased pain after undergoing incision and drainage of R pelvis hematoma the day prior.
3/25	BUEs PNCs removed	4/20	Return to OR for L AKA and LUE incision and drainage. Epidural left in place as patient receiving adequate pain control. L supraclavicular PNC placed for post-op pain control as well as future dressing changes (hand bloused with lidocaine and ropivacaine prior to dressing changes, no continuous infusion running).
3/26	Bilat supraclavicular PNB (single shots) and ketamine gtt (0.1mg/kg/hr) 2/2 BUE debridement	4/23	Lumbar epidural removed and replaced in pre-op (continuous infusion of 10mcg dilauidid/1cc of 0.1% bupivacaine @ 8cc/hr). Pt returned to OR for LLE wound debridement and LUE complex wound closure.
3/27	Ketamine gtt d/c’ d. R infraclavicular PNC and L supraclavicular PNC (0.125% bupivacaine @ 5cc/hr) 2/2 uncontrolled BUE pain	4/25	LUE supraclavicular PNC removed
4/1	Bolused 10cc of 0.2% ropivacaine w/dexamethasone into bilat PNC. PNC were then removed in preparation of RLE amputation and need for PCEA placement.	4/29	Pt returned to OR for skin grafting of LLE
4/2	L4/5 PCEA (bupivacaine 0.0625% 4/15/6) 2/2 R AKA	4/30	Lumbar epidural removed
4/3	L4/5 PCEA modified to (10mcg dilauidid/1cc of 0.1 bupivacaine @ 4/30/10)	5/16	L Femoral N PNC (bupivacaine 0.125% 4/30/6) 2/2 skin grafting of LLE
4/6	L4/5 PCEA modified back to bupivacaine 0.0625% 4/15/6 to minimize opioid consumption as pain had been well tolerated.	5/20	L Femoral N PNC removed
4/9	Pt underwent R hip disarticulation. Plan was to pull and replace epidural as current epidural had been in place for 7 days, which leads to an increased risk of infection from bacterial seeding. INR elevated at 1.8 (guidelines recommend INR 1.4 or less). Correcting coagulopathy with vitamin K and FFP. Pain well controlled with epidural.	5/22	Patient discharged

Amputation Progression



CONCLUSIONS

Postamputation pain is complex, involving neuropathic pain, phantom limb pain, and residual limb pain. Severe pre-amputation pain is linked to a higher risk of phantom pain. Poorly controlled postoperative pain also increases the likelihood of chronic pain. Therefore, preventing chronic postamputation pain through targeted perioperative interventions, such as peripheral nerve blocks, patient controlled epidural anesthesia, and systemic multimodal analgesic medications should be a key goal for pain physicians, surgeons, and anesthesiologists.

REFERENCES

- Rivera JA, Churovich K, Anderson AB, Potter BK. Estimating Recent US Limb Loss Prevalence and Updating Future Projections. Arch Rehabil Res Clin Transl. 2024 Oct 19;6(4):100376. doi: 10.1016/j.arrct.2024.100376. PMID: 39822203; PMCID: PMC11734033.