PBLD – Table #3

"I can't move my foot." 12 year old 40kg male is s/p radical resection of right femur osteosarcoma involving bone and soft tissues, right femur endoprosthetic replacement.

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Objectives:

1. Prevalence of malignant bone tumors
2. Incidence and etiology of postoperative neurological complications
3. Assessment of neurological complications
4. Management and prevention of neurological complications

Case history:
12 year old previously healthy male presented for right distal femur osteosarcoma resection with implantation of endoprothesis. Incisional biopsy done at outside institution confirmed the diagnosis of osteosarcoma, and patient is status post neoadjuvant chemotherapy.

Questions:

A. What is osteosarcoma? What is the rate of incidence amongst adolescent population?
B. How does osteosarcoma usually present itself?
C. What is the current treatment approach for primary bone sarcoma?

Pre-operative information:
Patient presented to our institution for open incisional biopsy of the right femur lesion 3 months ago that confirmed the diagnosis of chondroblastic osteosarcoma. Repeat MRI at the same time showed a large lesion involving 26cm of the distal femur with a soft tissue mass without encasing the neurovascular bundle. He completed preoperative chemotherapy including doxorubicin, cisplatin, and methotrexate and is ready for radical resection of the tumor. On physical examination, he ambulated independently, able to perform full extension and flexion of the right knee, full dorsiflexion and plantarflexion of the right ankle. Patient was able to wiggle all toes. Bilateral lower extremity sensation remained intact in all nerve distribution. The right thigh is tender to palpation with soft tissue fullness.

Questions:

A. Which chemotherapeutic agent can lead to peripheral neuropathy?
B. What is the temporal relationship between chemotherapy and potential nerve injury in the setting of regional anesthesia? Is this a valid concern?

Intra-operative Care:
With standard ASA monitoring, patient underwent intravenous induction with endotracheal intubation, then placed in left lateral decubitus for placement of lumbar epidural at L2-L3 interspace atraumatically. After negative test dose with 3ml 1.5% Lidocaine with 1:200,000 epinephrine, the epidural catheter was loaded with 1.5mg duramorph prior to skin incision then loaded with 7ml 0.5% Lidocaine prior to extubation. Performed operative procedure included radical resection of right femur osteosarcoma involving bone and soft tissues, microdissection of vascular structures, neuroplasty of sciatic, tibial and peroneal nerves, right knee arthrotomy, right knee total arthroplasty, right femur endoprosthetic replacement with local rotation muscle flap closure.

Questions:

A. What would be the optimal surgical analgesia for this type of surgery?
B. What is/are the risk(s) of placing epidural catheter in a patient under general anesthesia?
C. What is the synergistic effect of epidural opioid with local anesthetics?

Post-operative Care:

Epidural infusion with 0.15% Ropivacaine with 20 mcg/ml duramorph @ 12 ml per hour started post-operatively. Patient noted to be comfortable but with poor effort to move extensor halluces longus and tibialis anterior two hours after surgery. On POD 1, patient was not able to dorsiflex both feet with decreased sensation in bilateral lower extremity. Epidural infusion decreased to 10 ml per hour on the same day. On POD 2, epidural infusion was changed to 0.1% Ropivacaine with 20 mcg/ml duramorph @ 12 ml per hour for decreased motor on examination. Epidural catheter was accidentally dislodged on POD 3, patient was then transitioned to oral pain medication. Motor function in right foot improved on POD 4. Knee was placed in straight position with either a knee brace or posterior long leg splint. Patient noted to have decreased sensation in right foot on POD 7, symptom improved after adjusting the knee brace.

Questions:

A. What is the incidence of documented neuropraxia after a limb-salvaging surgery?
B. Which peripheral nerve is commonly affected?
C. How should neurological complication be assessed during the immediate post-operatively period?
D. When does neuropraxia occur? Immediately post-operatively or delayed?
E. What are the possible contributing factors for developing neuropraxia in this patient?
F. Can the masking effect of epidural analgesia cause a delayed diagnosis of neuropraxia in this case?
G. Can the concentration of local anesthetic in the epidural solution cause motor block on examination?
H. What is the best way to prevent neuropraxia for limb-salvaging surgery?
I. What would be an optimal approach to manage intra-operative and post-operative pain control without interfering with motor and neurological assessment in this patient?

Follow up:

Ten days after hospital discharge, patient reported resolution of right foot paresthesia. He was able to plantarflex and dorsiflex his right foot as well as extend his right toe with good strength during clinic visit.

Questions:

A. What is a typical time frame for resolution of neuropraxia?
B. Is epidural analgesia to blame for the occurrence of neuropraxia?
C. How to best prevent neuropraxia from occurring in limb-salvaging surgery?