NON-OPIOID
EXPAREL®
(bupivacaine liposome injectable suspension)

Administration Case Report: Posterior Spinal Fusion With Instrumentation for Adolescent Idiopathic Scoliosis

This case report represents the individual experience of Dr Suken A. Shah, and is intended to demonstrate his methodology for using EXPAREL in patients undergoing a posterior spinal fusion with instrumentation for adolescent idiopathic scoliosis.

Pacira BioSciences, Inc. recognizes that there are alternative methodologies for administering local anesthetics, as well as individual patient considerations when selecting the dose for a specific procedure.

EXPAREL is a local anesthetic that produces postsurgical analgesia in patients aged 6 years and older. It is administered via single-dose infiltration. When infiltrated into the surgical site, it produces local analgesia. When infiltrated in the fascial plane, it produces regional analgesia using regional techniques such as erector spinae plane (ESP) block, quadratus lumborum (QL) block, and transversus abdominis plane (TAP) block.

CASE INFORMATION

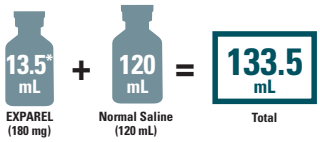
Physician Name	Suken A. Shah, MD
Affiliation	Nemours / AI duPont Hospital for Children Wilmington, DE
Surgical Case Performed	Posterior Spinal Fusion With Instrumentation for Adolescent Idiopathic Scoliosis
Inpatient or Outpatient Procedure	Inpatient

PATIENT CHARACTERISTICS

Gender	Female
Age	14 years
Patient Weight	45 kg
Patient History and Characteristics	The patient is a 14-year-old female who presented with a large magnitude scoliosis that was not amenable to brace treatment and a posterior correction with instrumentation and fusion was recommended. She has normal neurologic function (MRI normal) with mild to moderate back pain but participates in light sports and dance. Scoliosis x-rays demonstrate a double major curve pattern (Lenke 3) with curves measuring 80 and 75 degrees in the thoracic and lumbar areas, respectively. Her diagnosis is consistent with progressive adolescent idiopathic scoliosis.

The recommended dose of EXPAREL for adults is based on the size of the surgical site, the volume required to cover the area, and individual patient factors that may impact the safety of an amide local anesthetic. The maximum dose of EXPAREL should not exceed 266 mg.
The recommended dose of EXPAREL for patients aged 6 to <17 years old is 4 mg/kg, up to a maximum of 266 mg.

PROCEDURAL DETAILS

Incision Size	16 inches
Incision Type	Posterior spinal
Preoperative Analgesics Used	See appendix
Patient/Parent Education Regarding Pain Management	Conducted at the preoperative visit by our nurse practitioners. Pain expectations are assessed and education is provided. Multimodal pain management with opioid avoidance is emphasized, medications discussed (inpatient and outpatient strategies), and expectations for discharge are set.
Dosing and Administration	• 45 kg x 4 mg/kg = 180 mg dose • 180 mg ÷ 13.3 mg/mL = 13.5 mL of EXPAREL® (bupivacaine liposome injectable suspension) • EXPAREL then expanded with 120 mL normal saline injectable (Please refer to the Dosing and Administration Guide for calculations.)*
Needle Size, Number of Syringes	22-g spinal needles with 20-mL syringes (3) filled with EXPAREL and saline.
Premix or Administer EXPAREL Separately	EXPAREL mixed with normal saline for expansion.
Intraoperative Analgesic Used Dose of EXPAREL and Total Volume Used	 Maximum total volume: 45 kg patient x 4 mg/kg ÷ 0.89 mg/mL = 202.2 mL 202.2 mL - 13.5 mL of EXPAREL = 188.7 mL of normal saline. For this instance, only 120 mL of normal saline was needed. (Please refer to the Dosing and Administration Guide for calculations.)*

*EXPAREL is available in 10-mL and 20-mL vials.

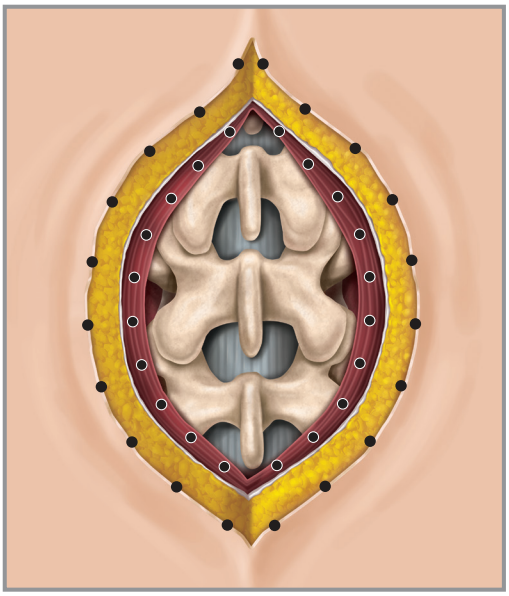
Bupivacaine HCl (which is approved for use in patients aged 12 and older) may be administered immediately before EXPAREL or admixed in the same syringe, as long as the ratio of the milligram dose of bupivacaine HCl to EXPAREL does not exceed 1:2. Admixing may impact the pharmacokinetic and/or physicochemical properties of EXPAREL, and this effect is concentration dependent. The toxic effects of these drugs are additive and their administration should be used with caution, including monitoring for neurological and cardiovascular effects related to local anesthetic systemic toxicity. Other than with bupivacaine, EXPAREL should not be admixed with other drugs prior to administration.

INFILTRATION NOTES

Injection sites are placed 1-1.5 cm apart in the erector spinae muscle plane (subfascial) and subcutaneously. Spinal needles are used to gain access a few centimeters lateral to the incision, penetrating the muscle in the subfascial location and injecting as needle is withdrawn from each injection site. This is repeated around the periphery of the incision, circumferentially, including the apices of the incision, since the soft tissues are subjected to trauma from the retractors.

This is done just prior to closure, or at the time of thoracodorsal fascial closure to view the anatomy and obtain precision with the injections.

EXPAREL was injected slowly and deeply (generally 1-2 mL per injection) into soft tissues using a moving needle technique (ie, inject while withdrawing the needle). Infiltrate above and below the fascia and into the subcutaneous tissue. EXPAREL was injected frequently in small areas (1-1.5 cm apart) to ensure overlapping analgesic coverage.



POSTSURGICAL INSTRUCTIONS INCLUDING PRESCRIPTIONS PROVIDED AND RECOVERY MILESTONES AND GOALS

- Patient was instructed to sit up in bed and allowed oral intake with a regular diet on POD #0
- POD #1 – out of bed to chair for 1-hour intervals (at least 2X) and ambulation in room or hall
- POD #2 – ambulation outside of room for 100 meters (at least 2X) and attempt stair climbing in proportion to home requirement. Discharge anticipated
- POD #3 – ambulation outside of room for >100 meters (at least 2X) and attempt stair climbing in proportion to home requirement. Discharge expected
- Pain medications: as an inpatient, scheduled oxycodone, valium, non-narcotic adjuncts as described in appendix; schedule is switched to as needed by POD #2
- Discharge medications: oxycodone (7 days), diazepam, ibuprofen, acetaminophen and stool softeners
- Initially, for the first several days at home: scheduled naproxen (weight-based dosing) twice daily, acetaminophen every 4-6 hours, oxycodone for breakthrough pain unrelieved by this non-narcotic regimen, diazepam for severe spasm. Stool softeners may be used for constipation until off of all narcotics

PATIENT FOLLOW-UP

- This patient did not use any IV narcotics after those received in the operating room and PACU
- Postsurgical pain was well controlled with oral narcotics and multimodal pain regimen listed on previous page
- Postsurgical visit at 4 weeks: patient was doing very well, had returned to school, and was interested in increasing her activity. She used less than ½ of the oxycodone prescribed and was off all pain medications in 1 week

PACU, post-anesthesia care unit; POD, postoperative day.

APPENDIX: DR SHAH'S MULTIMODAL PROTOCOL FOR IDIOPATHIC POSTERIOR SPINAL FUSION

PREOPERATIVE MANAGEMENT (PREOP HOLDING)*

- Gabapentin — **10 mg/kg/dose** (maximum = 600 mg)
- Acetaminophen — 12.5 – 15 mg/kg/dose
- Celebrex — >12 yo – 100 mg
  <12 yo – 50 mg

INTRAOPERATIVE MANAGEMENT

- Methadone — 0.075 – 0.1 mg/kg (2 divided doses)
- EXPAREL® (bupivacaine liposome injectable suspension) — 4 mg/kg/dose (maximum = 266 mg)

POSTOPERATIVE MANAGEMENT*

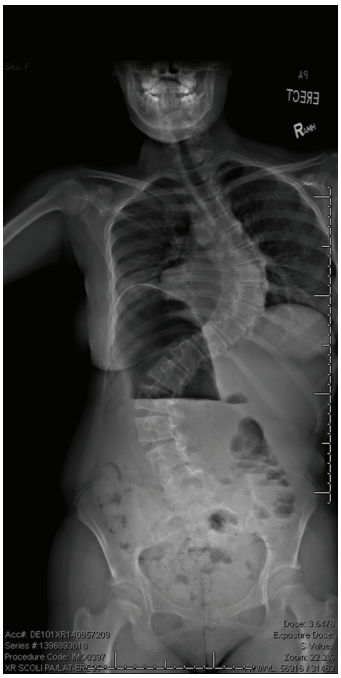
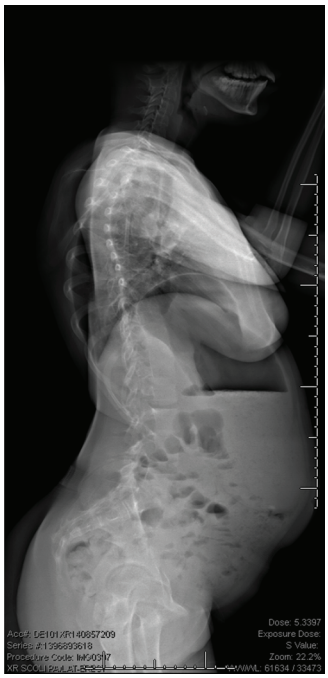
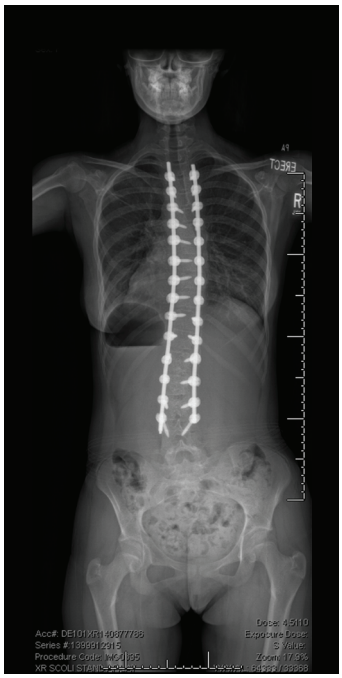
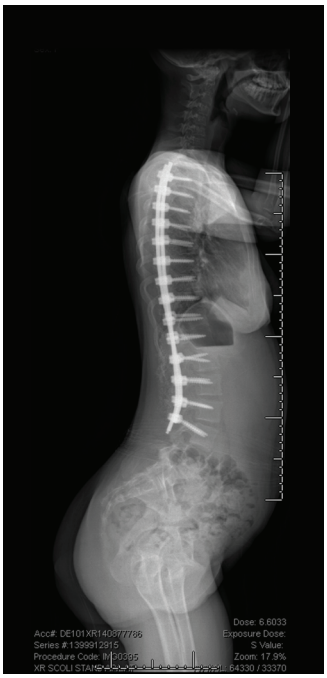
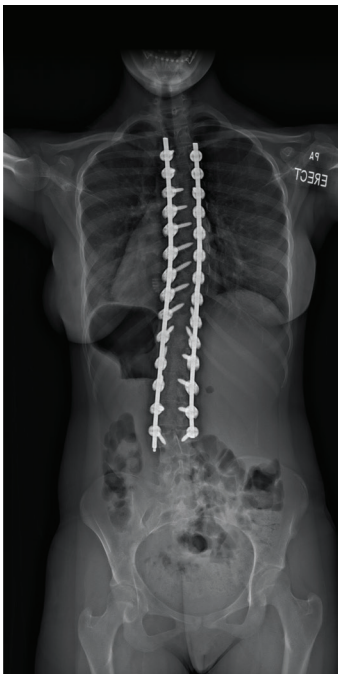
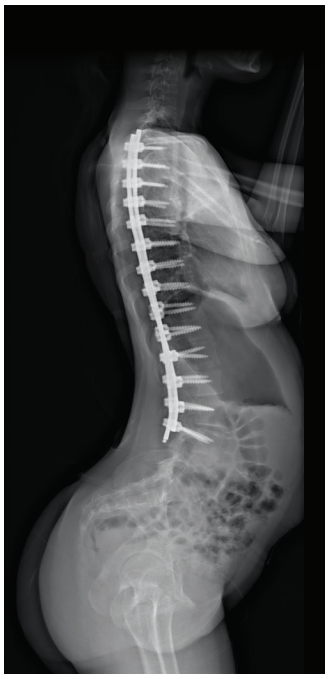
50 kg

- **POD #0**
  - Acetaminophen — 12.5 – 15 mg/kg/dose IV q6 hours x3 doses followed by oral acetaminophen
    12.5 – 15 mg PO q4 hours prn
  - Ketorolac — 0.25 – 0.5 mg/kg/dose IV q6 hours x7 doses
    - Maximum dose 15 mg
    - **Start at midnight day of surgery**
    - Followed by naproxen **500 mg** PO q12 hours
- Oxycodone — 5 mg PO q4 as needed for pain unresolved by acetaminophen
- Morphine — 2 mg IV q3 prn **if not tolerating oral meds**
- Valium — 2 mg PO q6 hours prn
- Gabapentin — **200 mg** PO 3 times daily – **start at 8 PM day of surgery**
- Clonidine — 50 mcg (½ of 0.1 mg/day patch) started in PACU
- Zofran — 0.1 mg/kg/dose IV q6 hours x4 doses then q8 hours prn (max dose 4 mg)

40–50 kg

- **POD #0**
  - Acetaminophen — 12.5 – 15 mg/kg/dose IV q6 hours x3 doses followed by oral acetaminophen
    12.5 – 15 mg PO q4 hours prn
  - Ketorolac — 0.25 – 0.5 mg/kg/dose IV q6 hours x7 doses
    - Maximum dose 15 mg
    - **Start at midnight day of surgery**
    - Followed by naproxen **375 mg** PO q12 hours
- Oxycodone — 5 mg PO q4 as needed for pain unresolved by acetaminophen
- Morphine — 2 mg IV q3 prn **if not tolerating oral meds**
- Valium — 2 mg PO q6 hours prn
- Gabapentin — **100 mg** PO 3 times daily – **start at 8 PM day of surgery**
- Clonidine — 50 mcg (½ of 0.1 mg/day patch) started in PACU
- Zofran — 0.1 mg/kg/dose IV q6 hours, then q8 hours prn (max dose 4 mg)

*This only represents Dr Shah's approach and is not to serve as general guidance from Pacira.
PO, by mouth; prn, as needed; q3, once every 3 hours; q4, once every 4 hours; q6, once every 6 hours; q8, once every 8 hours; q12, once every 12 hours.

Important Safety Information

EXPAREL® (bupivacaine liposome injectable suspension) is contraindicated in obstetrical paracervical block anesthesia.

Adverse reactions reported in adults with an incidence greater than or equal to 10% following EXPAREL administration via infiltration were nausea, constipation, and vomiting; adverse reactions reported in adults with an incidence greater than or equal to 10% following EXPAREL administration via interscalene brachial plexus nerve block were nausea, pyrexia, and constipation.

Adverse reactions with an incidence greater than or equal to 10% following EXPAREL administration via infiltration in pediatric patients six to less than 17 years of age were nausea, vomiting, constipation, hypotension, anemia, muscle twitching, vision blurred, pruritus, and tachycardia.

If EXPAREL and other non-bupivacaine local anesthetics, including lidocaine, are administered at the same site, there may be an immediate release of bupivacaine from EXPAREL. Therefore, EXPAREL may be administered to the same site 20 minutes after injecting lidocaine.

EXPAREL is not recommended to be used in the following patient populations: patients <6 years old for infiltration, patients younger than 18 years old for interscalene brachial plexus nerve block, and/or pregnant patients.

Because amide-type local anesthetics, such as bupivacaine, are metabolized by the liver, EXPAREL should be used cautiously in patients with hepatic disease.

Warnings and Precautions Specific to EXPAREL

Avoid additional use of local anesthetics within 96 hours following administration of EXPAREL.

EXPAREL is not recommended for the following types or routes of administration: epidural, intrathecal, regional nerve blocks **other than interscalene brachial plexus nerve block**, or intravascular or intra-articular use.

The potential sensory and/or motor loss with EXPAREL is temporary and varies in degree and duration depending on the site of injection and dosage administered and may last for up to 5 days, as seen in clinical trials.

Warnings and Precautions for Bupivacaine-Containing Products

Central Nervous System (CNS) Reactions: There have been reports of adverse neurologic reactions with the use of local anesthetics. These include persistent anesthesia and paresthesia. CNS reactions are characterized by excitation and/or depression.

Cardiovascular System Reactions: Toxic blood concentrations depress cardiac conductivity and excitability, which may lead to dysrhythmias, sometimes leading to death.

Allergic Reactions: Allergic-type reactions (eg, anaphylaxis and angioedema) are rare and may occur as a result of hypersensitivity to the local anesthetic or to other formulation ingredients.

Chondrolysis: There have been reports of chondrolysis (mostly in the shoulder joint) following intra-articular infusion of local anesthetics, which is an unapproved use.

Methemoglobinemia: Cases of methemoglobinemia have been reported with local anesthetic use.

Disclosure: Dr Shah is a paid consultant for Pacira BioSciences, Inc.

Full Prescribing Information is available at www.EXPAREL.com.

PP-EX-US-6750 07/21