

# Administration Case Report: Surgical Fixation of Rib Fractures

This case report represents the individual experience of Dr Jeff Gadsden, and is intended to demonstrate his methodology for using EXPAREL in patients undergoing surgical fixation of rib fractures.

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. It may also be infiltrated in the fascial plane to produce regional analgesia as a regional field block. Regional anesthetic techniques to produce regional analgesia include, but are not limited to, transversus abdominis plane (TAP) block, pectoralis (PEC) and serratus anterior plane (SAP) blocks, erector spinae plane (ESP) block, and quadratus lumborum (QL) block. EXPAREL may also be administered in adults as an interscalene brachial plexus nerve block, a sciatic nerve block in the popliteal fossa, and an adductor canal block to produce postsurgical regional analgesia.

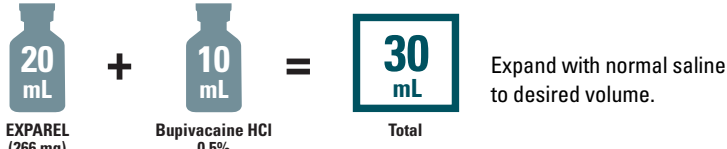
## CASE INFORMATION

<b>Physician Name</b>	Jeff Gadsden, MD, FRCPC, FANZCA
<b>Affiliation</b>	Associate Professor of Anesthesiology, Duke University School of Medicine, Durham, NC
<b>Surgical Case Performed</b>	Surgical fixation of rib fractures (rib plating)
<b>Inpatient or Outpatient Procedure</b>	Inpatient

## PATIENT CHARACTERISTICS

<b>Gender</b>	Male
<b>Age</b>	33 years
<b>Patient History and Characteristics</b>	Patient presented with right-sided rib fractures (ribs 3-7), a grade 1 liver laceration, a small, right-sided pulmonary effusion, and significant abrasions to his right upper and lower limbs and trunk. The anesthesiology team planned for a general anesthetic in addition to an ESP block for postoperative pain
<b>Patient Vitals</b>	Blood pressure: 143/85; heart rate: 97; respiratory rate: 26; oxygen saturation: 95% on 3 L of nasopharyngeal oxygen

## PROCEDURAL DETAILS

<b>Nature/Location of Injury</b>	Lateral fractures of ribs 3-7 on the right side
<b>Preoperative Analgesics Used</b>	20 mL (266 mg) EXPAREL admixed with 10 mL of 0.5% bupivacaine HCl; acetaminophen 975 mg PO
<b>Dose of EXPAREL and Total Volume Used</b>	

PO=by mouth.

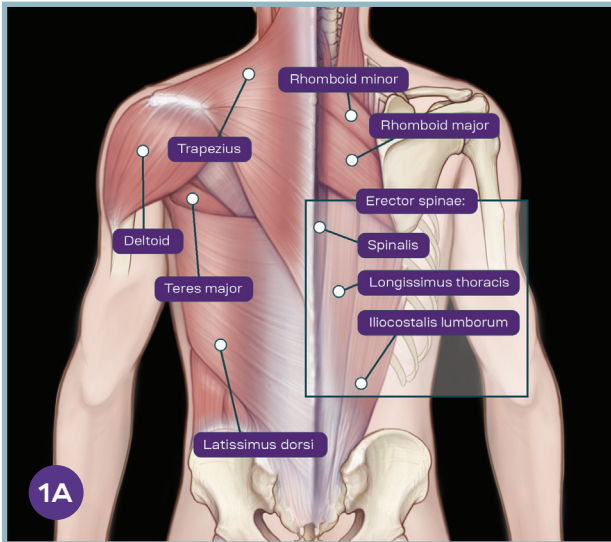
The recommended dose of EXPAREL for infiltration in adults is based on the size of the surgical site, the volume required to cover the area, and individual patient factors that may impact the safety of an amide local anesthetic. The maximum dose of EXPAREL should not exceed 266 mg. The recommended dose of EXPAREL for patients aged 6 to <17 years old is 4 mg/kg, up to a maximum of 266 mg. The recommended dose of EXPAREL in adults for interscalene brachial plexus nerve block, sciatic nerve block in the popliteal fossa, and adductor canal is 133 mg. The recommended dose of EXPAREL in adults for adductor canal block is 133 mg (10 mL) admixed with 50 mg (10 mL) of 0.5% bupivacaine HCl, for a total volume of 20 mL.

EXPAREL can be administered unexpanded (20 mL) or expanded to increase volume up to a total of 300 mL (final concentration of 0.89 mg/mL [ie, 1:14 dilution by volume]) with normal (0.9%) saline or lactated Ringer's solution.

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.

**Please see Important Safety Information on the last page and refer to accompanying full Prescribing Information, which is also available at [www.EXPARELpro.com](http://www.EXPARELpro.com).**

**INFILTRATION NOTES**

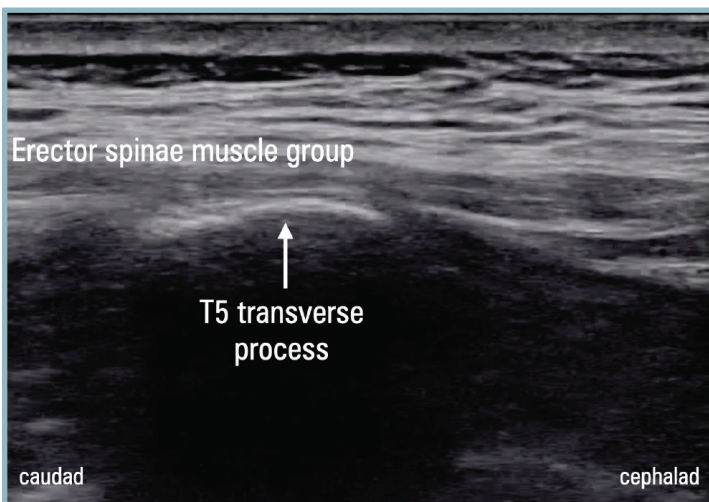


**FIGURE 1A.** Erector spinae muscle group



**FIGURE 1B.** Transducer and needle entry position for the ESP block at T5

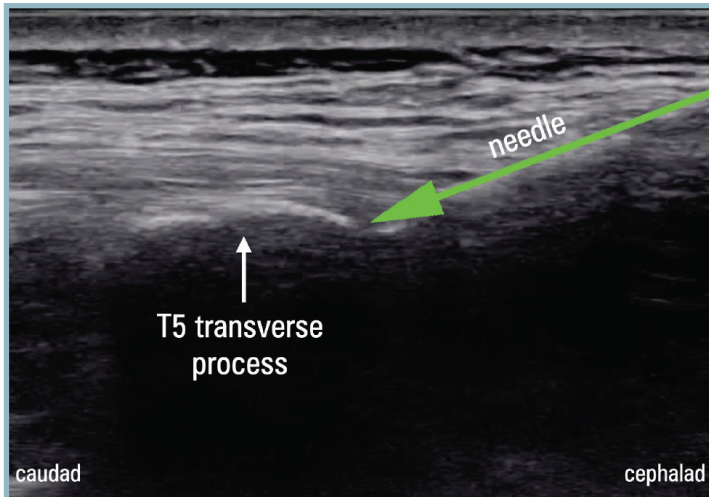
- ESP blocks were performed in the preoperative holding area. For this unilateral procedure, Dr Gadsden prepared one 30-mL syringe of injectate containing 20 mL (266 mg) of EXPAREL® (bupivacaine liposome injectable suspension) and 10 mL (50 mg) 0.5% bupivacaine HCl
- The patient was most comfortable positioned sitting, and fentanyl 100 mcg IV was administered for procedural analgesia/sedation
- A linear ultrasound probe was placed in a parasagittal orientation and the transverse process of T5 identified deep to the erector spinae muscle group



**FIGURE 2.** Sonoanatomy prior to needle insertion

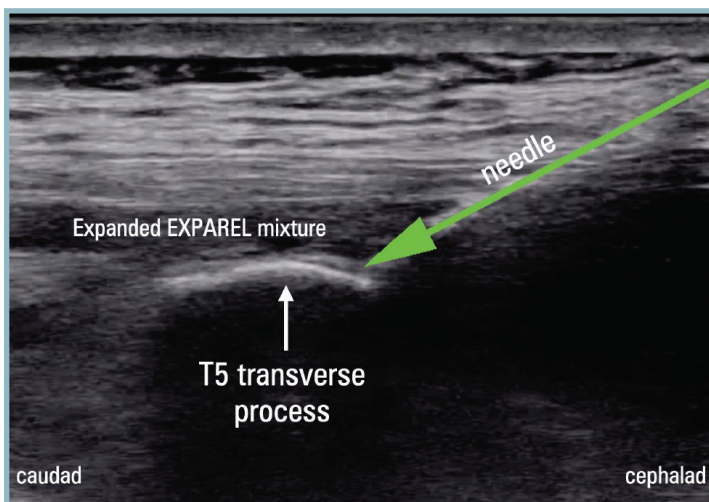
- A 21-gauge, 100-mm needle was advanced from the cephalad aspect of the probe until contact was made with the transverse process

## INFILTRATION NOTES (cont)



**FIGURE 3.** Needle contacting T5 transverse process

- Small boluses (1 mL) of saline were injected to confirm needle position underneath the deep fascia of the muscle, and the needle redirected to ensure the tip was not intramuscular
- Once satisfied with needle position, 30 mL of EXPAREL<sup>®</sup> (bupivacaine liposome injectable suspension) mixture was slowly administered



**FIGURE 4.** Pool of expanded EXPAREL mixture “lifting” the erector spinae muscle group off the transverse process

- The correct injection plane was confirmed by observing cranio-caudad spread and a lifting of the muscle off the transverse process

## TIPS

- The ESP block can be performed with the patient seated or in the lateral or prone position
- The ESP block should be performed at the mid-level of the fractured ribs. In this example, depositing the local anesthetic at T5 provides coverage both cephalad and caudad to cover ribs 3 through 7. The correct (T5) level can be easily determined by scanning 5 to 10 cm off the midline in order to visualize the ribs. Moving the probe caudad, the last rib encountered will be the 12th rib. The probe is then moved cephalad until the 5th rib is observed, then moved medially until the T5 transverse process comes into view
- Dr Gadsden always uses normal saline to hydrolocate the needle tip and ensure that the EXPAREL mixture will be deposited deep into the erector spinae muscle group, not intramuscularly



Watch Dr Gadsden infiltrate with EXPAREL at [www.EXPARELpro.com](http://www.EXPARELpro.com)

## IMPORTANT SAFETY INFORMATION

### Indication

EXPAREL® (bupivacaine liposome injectable suspension) is indicated to produce postsurgical local analgesia via infiltration in patients aged 6 years and older and regional analgesia in adults via an interscalene brachial plexus nerve block, sciatic nerve block in the popliteal fossa, and an adductor canal block. Safety and efficacy have not been established in other nerve blocks.

### Important Safety Information

EXPAREL 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 nerve block were nausea, pyrexia, headache, 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.

Do not admix lidocaine or other non-bupivacaine local anesthetics with EXPAREL. EXPAREL may be administered at least 20 minutes or more following local administration of 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 nerve blocks, 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, sciatic nerve block in the popliteal fossa, and adductor canal 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 Gadsden is a paid consultant for Pacira BioSciences, Inc.

**Full Prescribing Information is available at [www.EXPARELpro.com](http://www.EXPARELpro.com).  
For more information, please visit [www.EXPARELpro.com](http://www.EXPARELpro.com) or call 1-855-793-9727.**