This care process model (CPM) was developed by Intermountain Healthcare’s Surgical Services Clinical Program. It outlines the components of Intermountain Healthcare’s process for low-risk outpatient cholecystectomy. The authors used current trends in the peer-reviewed literature as well as the knowledge and opinion of multiple experts across Intermountain Healthcare to create this CPM.

KEY POINTS

This CPM outlines a multi-disciplinary approach to treatment of patients who have cholelithiasis, biliary dyskinesia, or vague abdominal pain but are otherwise healthy and without comorbid conditions. This CPM does not focus on diagnostic pathways, indications for the operation, nor how to perform a cholecystectomy.

Why Focus ON CHOLECYSTECTOMY

• It’s common. Cholecystectomy is a high-volume procedure, accounting for approximately 5,500 operations at Intermountain facilities in 2014 alone.

• It’s costly. In 2014, treatment costs for cholecystectomy at Intermountain facilities exceeded $24 million. Cost variations per case can be reduced by using a standardized approach.

• Care varies widely. There is a need to reduce variance in cholecystectomy care delivered in the Intermountain system.

Measurement and Evaluation

Intermountain is making a deliberate effort in CPM development to recommend and report on measurable outcomes that can be tied to process variations. These will provide a learning feedback loop by which process variations, outcomes results, and new research findings can be used for continuous improvement of the model. Specific outcome measures in this CPM include decreasing:

• Same-day surgery (SDS) length of stay
• Antibiotic use (none, any, pre-op, post-op within 30 days)
• Post-operative emergency room visits
• Post-operative admissions
• Post-operative readmission
• Post-operative narcotic use in SDS
• Cost

Indicates an Intermountain measure
**ALGORITHM: PERIOPERATIVE MANAGEMENT OF LOW-RISK CHOLECYSTECTOMY**

**Patient and surgeon agree on cholecystectomy**

Does patient meet criteria for low-risk laparoscopic cholecystectomy? (a)

- yes
  - PERFORM cholecystectomy (d)
  - TRANSFER to PACU (c, f)
  - DISCHARGE to home (d) FOLLW UP in clinic 1 to 2 weeks after discharge

- no
  - MODERATE-to-HIGH-RISK cholecystectomy
    - (Surgeon) DETERMINE care pathway for high-risk patients
    - USE Generic Surgery Hospital Power Plan

**Patient SCHEDULED for same-day surgery**

- (Surgeon / medical assistant) CHOOSE Laparoscopic Cholecystectomy Power Plan (b)
- ADMINISTER pre-operative meds: (c)
  - Pain control
  - Anticoagulation for at-risk patients (GUY, CAP)
  - Antiemetic
  - Antibiotics ARE NOT RECOMMENDED for low-risk laparoscopic cholecystectomy

**AlGORITHM NOTES**

(a) Criteria for low-risk laparoscopic cholecystectomy

- Healthy patients WHO HAVE biliary dyskinesia or symptomatic cholelithiasis
- Patients who DO NOT have cholecystitis, gallstone pancreatitis, complicated gallbladder disease, or possible gallbladder cancer
- Patients who DO NOT need to be treated in an inpatient setting or have comorbid conditions

(b) Preoperative procedure (per anesthesia criteria)

- FOLLOW NPO guidelines.
- INSERT peripheral IV line, and administer IV fluids.
- OBTAIN criteria-based diagnostic tests (imaging, labs, EKG).
- ADMINISTER medications. (c)
## (c) Peri-operative medications

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose</th>
<th>Preoperative</th>
<th>Intraoperative</th>
<th>Phase II Recovery</th>
<th>Discharge to home</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ONDANSETRON</strong> (Zofran)</td>
<td>Intra-operative dose (given by anesthesiologist):</td>
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<td></td>
<td>• &gt; 40 kg: 4 mg IV. May give an additional 4 mg IV PRN. No single dose</td>
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<td></td>
<td>• to exceed 16 mg/dose IV. May repeat twice, administered 4 and 8 hours</td>
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<td></td>
<td>• after initial dose for postoperative nausea and vomiting (PONV)</td>
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<td></td>
<td>• ≤ 40 kg: 0.1 mg/kg/dose</td>
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<tr>
<td><strong>TRANSDERMAL SCOPALAMINE</strong></td>
<td>1x1.5 mg extended release transdermal patch.</td>
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<tr>
<td><strong>CONTINUOUS INFUSION</strong></td>
<td>Lactated ringers or 0.9 % NS</td>
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<tr>
<td><strong>ACETAMINOPHEN</strong> (Tylenol)</td>
<td>Administer preoperatively, and then every 4 hours:</td>
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<tr>
<td></td>
<td>• Adult: 10–15 mg/kg/dose every 4 hours</td>
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<tr>
<td></td>
<td>• Pediatric: 15 mg/kg/dose every 4 hours</td>
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<tr>
<td><strong>IBUPROFEN</strong></td>
<td>Adult: 400 mg, 600 mg, or 800 mg PO (tablet) every 8 hours as needed</td>
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<tr>
<td></td>
<td>• for fever and mild pain</td>
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<tr>
<td></td>
<td>• &lt; 18 years: 10 mg/kg/dose PO (800 mg maximum dose)</td>
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<tr>
<td><strong>HEPARIN</strong></td>
<td>Adult only. 5,000 units x 1, preoperative subcutaneous injection if indicated</td>
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<tr>
<td><strong>ENOXAPARIN</strong></td>
<td>Adult only. 30 mg x 1, preoperative subcutaneous injection if indicated</td>
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<tr>
<td><strong>OXYCODONE</strong> (Oxycodone, Oxecta)</td>
<td>Administer preoperatively and then only if pain is not controlled with acetaminophen or ibprofen:</td>
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<tr>
<td></td>
<td>• Adult: 5 mg or 10 mg PO</td>
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<tr>
<td></td>
<td>• &lt; 15 years and &lt; 50 kg: 0.1 mg/kg/dose PO</td>
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<td></td>
<td>• &lt; 15 years and ≥ 50 kg: 5 mg oral solution or tablet</td>
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<tr>
<td><strong>KETEROLAC</strong> (Toradol)</td>
<td>Intraoperative dose given by anesthesiologist if surgeon agrees.</td>
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<td></td>
<td>Adults: 15 mg IV.</td>
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<tr>
<td><strong>TRAMADOL</strong> (ConZip, Ultram, Ryzolt)</td>
<td>Adult only. 50 mg or 100 mg every 6 hours as needed for mild pain.</td>
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<tr>
<td><strong>DEXAMETHASONE</strong> (Zocor, Maxidex, Baycador)</td>
<td>Adult: 8 mg IV</td>
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<td></td>
<td>Pediatric: 0.5 mg/kg/dose IV</td>
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<tr>
<td><strong>ANTIBIOTICS</strong></td>
<td>Antibacterial prophylaxis is not advised for low-risk gallbladder surgery (cholelithiasis, biliary dyskinesia).</td>
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</tbody>
</table>

1 Time of previous dose to be verified before administering new dose.  
2 Option for high-risk DVT, based on Caprini DVT Risk assessment.  
3 Option for post-operative pain control.

## (d) Intraoperative procedures

**NURSE:** APPLY sequential compression devices bilaterally to lower extremities prior to induction.  
**ANESTHESIOLOGIST:**  
• DO NOT GIVE:  
  – Benzodiazepines (except for patients with significant pre-operative anxiety)  
  – Long-acting anesthetic agents (e.g., Isoflurane).  
• GIVE:  
  – Fentanyl (Duragesic). 2 to 3 mcg/kg titrated to patient needs  
  – Ketorolac (Toradol): CONSULT with surgeon.  
  – Odanaceton (Zofran). > 40 kg: 4 mg IV OR < 40 kg = 0.1 mg/kg/dose  
  – Dexamethasone (Decedron). Adult: 8 mg IVwares, pediatric: 0.5 mg/kg/dose IV  
  – Total intravenous anesthesia (TIVA) for patients with history of severe postoperative nausea and vomiting  
**SURGEON:**  
• REQUEST tissue pathology and cytology.  
• PERFORM imaging with fluoroscopy (Isovue 300 mg), if applicable.  
• ADMINISTER pain control. **Local anesthetic** per surgeon:  
  – Lidocaine 1 % with epinephrine  
  – Bupivacaine 0.25 % with epinephrine  
  – Bupivacaine 0.5 % with epinephrine  

## (e) PACU

**Modified Aldrete Scoring System:**  
– Respirations/breath sounds  
– Activity  
– Circulation  
– SpO2/oxygen saturation  
– Color  
– Level of consciousness  
– Nausea/vomiting  
**GIVE ice chips; ADVANCE diet as tolerated.**  
**DISCHARGE** to home when phase II criteria met.  

## (f) SDS phase II recovery criteria

**DISCHARGE** criteria may include:  
• Vital signs are normal for age  
• Oral fluids are greater than IV maintenance  
• Home medications are well-tolerated (including new pain medication)  
• Pain controlled with oral medication (c)  
**PRESCRIBE:**  
– Ibuprofen.  
– Acetaminophen (repeat if > 4 hours since preoperative dose).  
– Oxycodone: **Only if ibuprofen and acetaminophen fail.**
REFERENCES

The following references were used in the creation of this CPM:


PATIENT AND PROVIDER RESOURCES

Intermountain patient resources

Clinicians can order Intermountain patient education booklets and fact sheets for distribution to their patients from Intermountain’s printstore.org.

Fact sheets:
- Laparoscopic Gallbladder Surgery: Home Instructions (also available in Spanish)
- Managing Short-Term Pain at Home (also available in Spanish)

Provider resources

To find this CPM and its reference list, clinicians can go to intermountainphysician.org. Click on A-Z Index — Clinical Programs — Surgical Services — CPMs and Guidelines, and look for the topic list on the right.

Additional links
- Modified Caprini risk assessment model for VTE in general surgical patients
- Procedural bleeding risk

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This CPM presents a model of care based on the best available scientific evidence at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base. Send feedback to David E. Skarda, MD, Medical Director, Surgical Services Clinical Program, Intermountain Healthcare. David.Skarda@imail2.org.