WHAT'S NEW IN POST-OP PAIN FOR GYNECOLOGIC SURGERY?

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OBJECTIVES

- Describe the current impact of post-op pain after gynecologic surgery
- Provide an overview of options for post-op analgesia
  - Non-opioid analgesics
  - Regional anesthesia:
    - Spinal
    - Epidural
    - Transversus Abdominus Plane Blocks
- Discuss the rationale and benefits of multimodal analgesia and Enhanced Recovery After Surgery (ERAS) pathways

PAIN AFTER GYNECOLOGIC SURGERY

- 40% of laparoscopic gynecologic surgery patients have inadequate pain control after discharge
- 45-51% of major gynecologic surgery patients reported inadequate pain control on POD#3
- After 2 weeks, 23% report inadequate pain control
- By 6 weeks, ~50% feel recovered


DISCLOSURES

- None
**ACUTE → CHRONIC PAIN**

- 5-32% incidence of chronic pelvic pain 1 year after hysterectomy
- Chronic post-surgical pain (CPSP)
  - Lasts at least 2 months after surgery
  - Most consistent patient factors are preoperative and postoperative pain

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**RISK FACTORS FOR CPSP AFTER HYSTERECTOMY**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Odds Ratio (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative pelvic pain</td>
<td>3.25 (2.40-4.41)</td>
<td>0.002</td>
</tr>
<tr>
<td>Previous cesarean delivery</td>
<td>1.54 (1.08-2.20)</td>
<td>0.025</td>
</tr>
<tr>
<td>Pain conditions elsewhere</td>
<td>3.19 (2.28-4.49)</td>
<td>0.001</td>
</tr>
<tr>
<td>Primary indication for surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laparoscopy</td>
<td>1.00 (Reference variable)</td>
<td>0.624</td>
</tr>
<tr>
<td>Vaginal</td>
<td>1.13 (0.66-1.90)</td>
<td>0.624</td>
</tr>
<tr>
<td>Cesarean</td>
<td>1.03 (0.94-1.14)</td>
<td>0.929</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>3.86 (1.54-9.77)</td>
<td>0.002</td>
</tr>
<tr>
<td>Cervical dysmenorrhea</td>
<td>2.98 (1.87-4.72)</td>
<td>0.001</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>0.60 (0.36-1.00)</td>
<td>0.048</td>
</tr>
<tr>
<td>Other</td>
<td>1.18 (0.67-2.08)</td>
<td>0.580</td>
</tr>
<tr>
<td>Type of hysterectomy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total abdominal</td>
<td>1.20 (0.77-1.86)</td>
<td>0.427</td>
</tr>
<tr>
<td>Subtotal abdominal</td>
<td>1.22 (0.72-2.08)</td>
<td>0.427</td>
</tr>
<tr>
<td>Laparoscopic assisted vaginal hysterectomy</td>
<td>1.27 (0.60-2.70)</td>
<td>0.512</td>
</tr>
<tr>
<td>Spinal anesthesia</td>
<td>0.70 (0.74-3.87)</td>
<td>0.997</td>
</tr>
<tr>
<td>Operating at hospital</td>
<td>0.52 (0.33-0.80)</td>
<td>0.010</td>
</tr>
<tr>
<td>Unplanned surgery</td>
<td>0.42 (0.21-0.89)</td>
<td>0.013</td>
</tr>
<tr>
<td>No unplanned surgery</td>
<td>1.00 (Reference variable)</td>
<td>0.696</td>
</tr>
<tr>
<td>Postoperative analgesia</td>
<td>1.00 (Reference variable)</td>
<td>0.696</td>
</tr>
</tbody>
</table>

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**CHRONIC PAIN AFTER HYSTERECTOMY**

- Surgical approach was not a risk factor
  - Abdominal, vaginal, laparoscopic
- Total vs. subtotal abdominal hysterectomy
- Unclear effect of spinal vs. GA on CPSP
  - Spinal associated with less pain than GA in a nonrandomized study (OR 0.42, CI: 0.21-0.85)
  - No difference in pain scores after 12 weeks in one RCT

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**OPIOIDS**

- Respiratory Depression
- PONV
- Delay of early mobilization
- Paralytic ileus
- Immuno-suppression
MULTIMODAL ANALGESIA

- Optimize additive effects of various agents
- Utilize different modes of analgesia
  - Non-opioid analgesics
  - Regional anesthesia
- Minimize side effects
- Facilitate patient recovery and ambulation

HOW OFTEN DO YOUR PATIENTS HAVING GYNECOLOGIC SURGERY RECEIVE POST-OP NSAIDS?

A. Always
B. Sometimes
C. Rarely
D. Never

NSAIDS AND COX2-INHIBITORS

- NSAIDS and COX2 inhibitors have opioid-sparing activity
  - 22-50% in patients undergoing gynecologic surgery
- NSAIDS reduce opioid-related side effects
- Undesirable side effects include platelet dysfunction, renal impairment, and GI irritation.
  - 2.4% surgical-related bleeding vs. 0.4% with placebo
- Does ketorolac increase postoperative bleeding?

Effect of Ketorolac on perioperative bleeding

**NSAIDS: ON DEMAND VS. FIXED INTERVAL**

<table>
<thead>
<tr>
<th></th>
<th>Fixed interval group</th>
<th>On-demand group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of analgesic doses in first 24 h</td>
<td>4.63 ± 1.22  (n=41)</td>
<td>5.61 ± 0.4 (n=30)</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Time from delivery to first analgesic dose (h)</td>
<td>3.1 ± 0.4  (9)</td>
<td>3.15 ± 0.9  (9)</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Time from first to second analgesic dose (h)</td>
<td>3.97 ± 0.5  (9)</td>
<td>3.78 ± 0.4  (6)</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Pain score at first analgesic dose</td>
<td>5.5 ± 2.9 ± 1 (8) n = 54</td>
<td>7.5 ± 2.5 (77) n = 60</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Pain score at second analgesic dose</td>
<td>4.3 ± 2.9 ± 1 (44) n = 54</td>
<td>7.8 ± 1.8 (69) n = 59</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Pain score at third analgesic dose</td>
<td>6.0 ± 2.9 ± 1 (46) n = 54</td>
<td>7.6 ± 2.2 ± 1 (77) n = 50</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Overall satisfaction score</td>
<td>77.3 ± 18.9 (n=54)</td>
<td>79.6 ± 21.9 (n=56)</td>
<td>&lt;.001*</td>
</tr>
</tbody>
</table>

Fixed interval NSAID dosing provides more effective post-operative cesarean analgesia and results in higher patient satisfaction than on-demand dosing.


**ACETAMINOPHEN**

- 30-40% opioid-sparing effect in gynecologic surgery with 1g once or twice daily dosing regimen
- Max dosing 4g/day
- Equal efficacy as NSAIDS
- Improved analgesia and reduced PONV when combined with NSAIDS compared with either drug alone


**IV VS. PO ACETAMINOPHEN**

- Higher peak plasma concentrations
- Increased cost
- No current analgesic outcome benefit


**HOW OFTEN DO YOUR PATIENTS HAVING GYNECOLOGIC SURGERY RECEIVE GABAPENTIN?**

- A. Always
- B. Sometimes
- C. Rarely
- D. Never
- E. Don’t know
GABAPENTIN

- Structural analog to GABA
- Perioperative gabapentin reduces acute postop pain and opioid use.
  - 35% reduction in total opioid use over 1st 24 hours post-op
  - Reduces preop anxiety, PONV, pruritis
- Increases patient satisfaction


Side effects:
- Sedation (RR 1.65)
- Dizziness (RR 1.4)
- Visual disturbances
- Optimal dose unclear:
  - Most studies: Gabapentin 600-1200mg given 1-2 hours preop
  - Minimal effective dose of Preop Gabapentin = 600mg


PREGABALIN

- Reduced postoperative pain scores and opioid use in 1st 24 hours
- Optimal dose unclear: 100mg-300mg once or q8-12 hours


GABAPENTINOIDS REDUCE CPSP

REGIONAL ANESTHESIA

- Spinal
- Epidural
- Transversus Abdominus Plane (TAP) Block

SPINAL ANESTHESIA

- Spinal anesthesia reduces postop opioid use for 48 hrs
  - Likely due to IT morphine
- More cost-effective than GA ($969 savings/patient)
  - Shorter PACU stay (median 282 vs. 234 min)
  - Improved quality of life scores
- Unclear effect on hospital length of stay:
  - No difference for vaginal hysterectomy
  - Shorter LOS in abdominal hysterectomy (2.2 vs. 3.3 days)

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INTRATHECAL MORPHINE DOSES FOR POST-CESAREAN ANALGESIA

- Lower pain scores than with PCA opioids
- Reduced opioid use
- Higher patient satisfaction
- Faster return of bowel function

EPIDURAL ANALGESIA

- Did not reduce hospital length of stay

References:
DO EPIDURALS IMPROVE SURVIVAL AFTER GYN CANCER SURGERY?

- Epidurals may inhibit tumor spread and growth due to:
  - Intrinsic tumor suppression properties of local anesthetics
  - Minimize opioid induced and surgically induced immunosuppression
  - Suppression of adrenergic stimulation during surgery
  - Avoidance of GA, which suppresses NK cell activity
- RCT of women for ovarian CA: Patients with combined epidural + GA have higher antitumorigenic cytokines and NK cell cytotoxicity than those with GA alone


EPIDURALS AND SURVIVAL

- GA + Epidural associated with lower rate of ovarian cancer recurrence vs. GA alone (72 vs. 85%, p = 0.028)
- Longer DFS associated with >48h of epidural use
- Use of Desflurane vs. Sevoflurane associated with lower rate of recurrence (63 vs. 84%, p = 0.01)


TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCK

Figure from Ultrasound For Regional Anesthesia, 2008

ARE TAP BLOCKS ROUTINELY USED AT YOUR INSTITUTION FOR POST-OP ANALGESIA?

A. Yes
B. No
C. Don’t know

29% 49% 22%
**TAP BLOCK TECHNIQUE**

- Placed between subcostal margin and iliac crest
- Blind or US guided techniques
- 20-30mL of local anesthetic injected incrementally on each side
- Complications:
  - Intravascular injection
  - Bowel perforation
  - Liver trauma
  - Intraperitoneal injection (18% with blind technique)


**TAP BLOCK: US-GUIDED TECHNIQUE**


**TAP BLOCK: US TECHNIQUE**


**TAP BLOCKS FOR ABDOMINAL HYSTERECTOMY**

- 5 RCTs, n = 225
- Reduced pain scores
- Reduced opioid use
- Limited effect to first 24 hours

TAP BLOCKS FOR LAPAROSCOPIC SURGERY

- 10 RCTs, n = 633
- 3 gynecologic
- TAP blocks reduce pain scores and opioid use.
- Preoperative TAP blocks had greater effects on early (0-4 hr) pain consumption.


ENHANCED RECOVERY AFTER SURGERY (ERAS)

Mid-thoracic epidural anesthesia/analgesia
No nasogastric tubes
Prevention of nausea and vomiting
Avoidance of salt and water overload
Early removal of catheter
Early oral nutrition
Non-opioid oral analgesia/NSAIDs
Early mobilization
Stimulation of gut motility
Audit of compliance and outcomes


ERAS FOR MAJOR GYNECOLOGIC SURGERY

- Types of studies:
  - RCT (1), Nonrandomized prospective (2), Retrospective pre and post-intervention (6)
- Types of cases:
  - Abdominal hysterectomy (5), vaginal hysterectomy (1), laparotomy for gynecologic cancer surgery (3)
- ALL of these studies have found reduced hospital length of stay in ERAS group.
- However:
  - High variation in ERAS interventions
  - Lack of standardization of interventions


HYSTERECTOMY ENHANCED RECOVERY PATHWAYS

- 2015 Retrospective cohort study (n=223):
  - Open gynecologic surgery for non-malignant lesions
  - Increased POD1 discharges post-ERAS (34% vs. 7%)

ERAS FOR HYSTERECTOMY - RCT

<table>
<thead>
<tr>
<th>Control (n=26)</th>
<th>ERAS (n=27)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preop:</strong></td>
<td></td>
</tr>
<tr>
<td>Paracetamol, NSAID, COX2 inhibitor</td>
<td>Paracetamol, NSAID, COX2 inhibitor</td>
</tr>
<tr>
<td>Carbohydrate drink &lt; 2h before surgery</td>
<td></td>
</tr>
<tr>
<td><strong>Intraop:</strong></td>
<td></td>
</tr>
<tr>
<td>GA (Nitrous + Volatile agent)</td>
<td>Spinal bupivacaine + morphine 100mcg</td>
</tr>
<tr>
<td>Ondansetron</td>
<td>Betamethasone + droperidol + ondansetron</td>
</tr>
<tr>
<td>IV fluid restricted to 500mL/h</td>
<td></td>
</tr>
<tr>
<td><strong>Postop:</strong></td>
<td></td>
</tr>
<tr>
<td>Paracetamol + Morphine PCA</td>
<td>Paracetamol + NSAID</td>
</tr>
<tr>
<td>IV fluids stopped with oral intake</td>
<td></td>
</tr>
</tbody>
</table>


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ERAS FOR HYSTERECTOMY - RCT

<table>
<thead>
<tr>
<th>TIVA (n: 27)</th>
<th>PCA (n: 26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time post-operative ward (min)</td>
<td>180 (105–330)</td>
</tr>
<tr>
<td>Start peroral fluid (h)*</td>
<td>4 (2–6)</td>
</tr>
<tr>
<td>Indwelling catheter (h)</td>
<td>9 (5–23)</td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td>2 (1–3)</td>
</tr>
<tr>
<td>Time to resuming work (days)†</td>
<td>28 (10–46)</td>
</tr>
</tbody>
</table>

- Lower rate of PONV (11% vs. 50%, p<0.01)


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UCSF ERAS FOR GYN-ONC LAPAROSCOPY

- No bowel prep. Boost Breeze until 2 hours
- Gabapentin, APAP, NSAIDs periop
- Fluids <2L
- TAP blocks or lidocaine gtt
- Temperature >36
- PONV PPx (decadron, zofran, scopolamine)
- Goals:
  - Foley out by 6hrs
  - Regular diet on POD#0
  - Early mobilization
  - Discharge by noon

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ERAS FOR GYN-ONC LAPAROSCOPIC SURGERY

- Improved pain scores
- Reduced opioid consumption
- Reduced PONV rate
- Higher rate of Regular diet on POD#0
- Foley removed 10 hours earlier
- 100% of patients discharged on POD#1
- Future plans: Expansion to open gynecologic cancer surgery and benign gynecologic surgery
Pain after gynecologic surgery affects quality of life and can lead to chronic pain.

Improved acute pain management may help decrease development of CPSP.

Multimodal analgesic techniques and ERAS pathways decrease opioid consumption, improve patient satisfaction, and can reduce length of stay.

Use neuraxial analgesia when possible. TAP blocks for those who cannot have neuraxial.