

©Copyright, 2004, Beverly K. Philip, All rights reserved.

Fast Track Recovery

Beverly K. Philip, MD
Professor of Anaesthesia
Harvard Medical School
Director, Day Surgery Unit
Brigham and Women's Hospital
Boston, USA

Fast Track Recovery

“Bypass PACU 1” or “Direct to Recovery Lounge”

A Facilitated Total Patient Care Process

Why?

- To reach our goal: pt ”back to normal” sooner
 - improve patient outcome
 - improve patient & surgeon satisfaction
- Save costs, labor

Fast Track Recovery

- Choice of Anesthetic Agents
- Recovery Challenges: Nausea, Pain
- Managing the Recovery Process

I Choice of Anesthetic Agents

General Anesthesia: Evidence-Based Choices

- Sevoflurane has best airway tolerability
Doi M, Ikeda K. Can J Anaesth 1993;40:122-6.
- Isoflurane has slower recovery than other volatiles
Philip B et al. Anesth Analg 1996;83:314-9.
Ghourri A et al. Anesthesiology 1991;74:419-24.
- Remifentanil controls hemodynamics w/o ↑ recovery
Philip BK et al. Anesth Analg 1997;84:515-521.
- Opioid-NMB/ No volatile: 2-3 x risk of awareness
Domino KB et al. Anesthesiology 1999;90:1053-61.

Changing from Iso to Des Near End - Effect on Recovery

Five volunteers FGF = 2 L/min O₂/Air

120 min 1.25 MAC Des [9.1% ET]

120 min 1.25 MAC Iso [1.6% ET]

90 min 1.25 MAC Iso, then

30 min Des, for total 1.25 MAC ET anesthetic.

Non-randomized, non-blinded.

Neumann MA et al. Anesthesiology 1998;88:914-21.

Changing from Iso to Des Near End - Effect on Recovery

Times to respond to command & orientation

Des < Xover = Iso

Digit symbol substitution and P-deletion tests

Des < Xover = Iso

Changing from Iso to Des Near End - Effect on Cost

2 L/min 120 min 1.25 MAC Des /O2 \$29.04

2 L/min 120 min 1.25 MAC Iso /O2 \$ 8.87

2 L/min 90 min Iso - 30 min Des :

\$7.04 + \$ 4.71 = \$11.75

• [vs Iso] Cost + , Recovery ≈.

If 6 L/min Xover: \$7.04 + \$15.94 = \$22.98

• Cost ++ , Recovery ?.

Propofol “Sandwich” to Prevent PONV

Propofol Ind/ Iso Maint vs

Propofol Ind/ Iso Maint/ Propofol x30 min

• Similar N/V

• Similar sedation

2.5 h major breast surgery F 300 ug; MS 10 mg 24h

Gan TJ et al. Anesthesiology 1996;85:1036-42.

Propofol and Antiemesis

Within control event rate of 20-60%, 6069 pts

Propofol for induction vs other IV agent

• early N, 0-6h variable decrease NNT 5 (2.7-35)

• late N, 0-48h no decrease NNT 28 (5.3-∞)

Propofol for maintenance vs inhalation agent

• early N, 0-6h consistent decrease NNT 4.7 (3.8-6.3)

• late N, 0-48h variable decrease NNT 6.1 (3.9-15)

Effects on vomiting similar.

Tramèr M et al. Brit J Anaesth 1997;78:247-55.

Fast-Track ‘Eligibility’

“Eligibility”: Modified Aldrete Score = 10

Times	<u>Des</u>	<u>Sevo</u>	<u>Prop</u>
Awakening	5 ± 3	5 ± 3	8 ± 7 *
Orientation	10 ± 5	12 ± 4	15 ± 5 *
Aldrete = 10	10 ± 4	12 ± 4	16 ± 5 *
PONV wn 4 hr	30%	20%	10% (ns)
Home Readiness	140 ± 48	143 ± 40	149 ± 4

LTL ~70 min; Mz 2, F 2, Miv, Ketorolac, Drop, Bupiv

Song D et al. Anesth Analg 1998;86:267-73.

PONV: Other Anesthetic Drugs

- ↑: Neostigmine dose-response > 2.5 mg
omitting relaxant reversal 2.5 mg NNT ≈4
 - ↑: Glycopyrrolate vs Atropine
 - ↑: Vomiting w N2O NNT ≈12
only when baseline incidence high (>30%) otherwise NE NNT 5.6 vs 43.5
↑ risk intraop awareness
- Tramer M. Acta Anaesth Scand 2001;45:4-13.
Salmenperä M et al. Acta Anaesth Scand 1992;36:445-8.
Tramer M et al. Br J Anaesth 1996;76:186-93.

II Recovery Challenges :

- Pain Management
- Nausea Management

Plan for Recovery

from the Beginning of the Anesthetic

Control of Pain

Multimodal approach

Based on pre- and intra- operative:

Local/regional blocks

NSAIDs

Crews JC. JAMA 2002;288(5):629-32

Appropriate opioids ...

Abolition of pain not realistic

Control of Nausea/ Vomiting

Most common reason for admission

Multifactorial problem,

with no single solution

Systematic, cost-conscious approach

Perioperative Fluids and Recovery

Fasted patients

20 ml/kg {vs 2 ml/kg} 30 min ops

↓ thirst, drowsiness, dizziness, nausea

Hrs 0.5-1.5, 24

1000 ml {vs none} 12 min op

↓ nausea, vomiting; faster time to first drink

Hrs 1-6, 24, 48, 72

Yogendran S et al. Anesth Analg 1995;80:682-6.

Elhakim M et al. Acta Anaesth Scand 1998;42:216-9.

Control of Nausea/ Vomiting :

Hydration and Food

Appropriate duration of preop fast -

2 hr clear liquids, MN for solids

Adequate perioperative fluid replacement

for the entire operative day
 Do not push patients to drink while in ASU
 Do not provide solid foods
 "Eat when hungry"

Fentanyl vs Ketorolac: Laparoscopy

At induction:	Fentanyl 100 µg	Ketorolac 60 mg
Maintenance PFL	129 ± 35 mg	170 ± 63 mg *
Ambulation	83 min	64 min
Discharge ready	165 min *	120 min
PACU: addl mL analg	84 % *	56 %
PACU: emetic sequelae	42 %	23 %
rescue antiemetics	29 % *	10 %
Total 24 hr: emetic seq	52 % *	28 %

Sukhani R et al. Anesth Analg 1996;83:975-81.

Fentanyl vs Ibuprofen: Laparoscopy

double blind	Fentanyl 75 µg	Ibuprofen 800 mg
	IV 30 min a end	PO 1hr preop
Pain PACU 1, VAS	4.3	3.8
Pain PACU 2, VAS	6.0 *	3.5
Pain Home, VAS	6.3 *	3.7
Nausea PACU 2, 0-3	2.6 *	1.3

*Severity of nausea PACU 2 vs Total fentanyl dose
 Total Fentanyl 101.7 ± 6.7 µg * 36.7 ± 9.1 µg
 TP/ Iso/ 50% N2O; Vec + revers; ~ 90 min
 Rosenblum M et al. Anesth Analg 1991;73:255-9.

Fentanyl and PONV

GYN hysteroscopy 60 pts

Prop or Sevo ind, Sevo/N2O maint, Ketorolac & LA
 No Fentanyl; No vomiting [no anti-emetic]

Abdominoplasty, Conscious sedation F + MZ

↑ F dose → ↑ length of stay due to PONV

Pediatric strabismus

F 1 ug/kg vs Ketorolac: more and more severe Vom

Philip BK et al. Anesth Analg 1999; 89: 623-627

Byun MY et al. Plastic Reconstr Surg 1999;103:1260-6.

Mendel HG et al. Anesth Analg 1995;80:1129-33.

Dose of Fentanyl vs Postop Nausea/Vomiting

- Severity of nausea in PACU 2 proportional to Total Fentanyl dose
 Rosenblum M et al. Anesth Analg 1991;73:255-9. laparoscopy
- Early efficacy of antiemetic treatment
 [abolition vomiting wn 10 min or nausea wn 30 min, x 1hr]
 inversely proportional to Intraop Fentanyl dose,

for ondansetron, metoclopramide or placebo
Polati E et al. Anesth Analg 1997;85:395-9.

Control of Nausea/ Vomiting :

Appropriate Opioid Use

Consider alternate and complementary treatment modalities

Minimize total dose

Timing : Give small boluses, eg fentanyl 25 µg
Near end of procedure

Avoid long-acting opioids, with long side effects

Control of Nausea/ Vomiting :Anesthetic Considerations

Give a “clean” anesthetic
and then

Anti-emetic drug/s

- Prophylaxis if high risk
- otherwise, Treatment

Activating Stimuli for Postoperative N/V

Receptor Site Affinity of Antiemetic Drugs

Drugs	Dopamine	Muscarinic	Histamine	Serotonin
Prochlorperazine	++++			
Droperidol	++++		+	+
Promethazine	++	++	++++	
Scopolamine	+	++++	+	
Metoclopramide	+++		+	++
5-HT ₃ RAs				++++

Dexamethasone ?sensitize receptors ?5HT₃ reduction ?PG

Anti-Emetic Drug Protocol : Prophylaxis if Moderate - High Risk

Droperidol 0.6 [-1.2] mg {?}

Dexamethasone 8 mg

Ephedrine 50 mg IM

Metoclopramide 20 mg

Meclizine 25 mg PO; Transderm scopolamine

Very high risk: 5-HT₃ antagonists, at end

Ondansetron 4 mg, Dolasetron 12.5 mg

Anti-Emetic Drug Protocol : Treatment

5-HT₃ antagonists, e.g. □:

Ondansetron 1 mg

Other ‘prophylactic’ antiemetics if not given:

Dexamethasone Ephedrine Metoclopramide Meclizine

Sedating anti-emetics:

Promethazine 12.5 mg, Prochlorperazine 25 mg PR

If An Approach Fails:

repeat with same drugs is generally ineffective

Dexamethasone for Prevention of PONV

PONV incidence, %

Efficacy:	<u>Dexamethasone</u>	<u>Placebo</u>	<u>NNT (95% CI)</u>
0-6h	21%	35%	7.1 (4.5-18)
0-24h	24%	50%	3.8 (2.9-5.0)

Henzi I et al. Anesth Analg 2000;90;186-94. Meta-analysis

24h. Wang JJ et al. Anesth Analg 2000;91;1404-7; Liu K et al. Anesth Analg 1999;89;1316-8

PONV Prophylaxis: I.M. Ephedrine vs Drop

	<u>Ephedrine</u> 0.5 mg/kg	<u>Droperidol</u> 0.04 mg/kg	<u>Placebo</u>
Total PON+V	34% *	38% *	67%
Antiem Tx	22% *	19% *	55%
Sedation	6.3% *	66% >>	37%
Mean Art P@ 30m	92 ± 9	92 ± 12	99 ± 10
D/C Time,min	76 ± 39	97 ± 51	91 ± 39
Vomit @home	6%	6%	9%

Rothenberg et al. Anesth Analg 1991;72;58-61. OP Gyn Laparoscopy, ~31 yr

Prophylaxis: Metoclopramide 20 mg vs Ondansetron 8 mg, given @ end Lap Chole

		<u>Metoclop</u>	<u>Ondans</u>
% PON+V	0-6 h	31%	39%
	0-24 h	47%	43%
Rescue Tx	0-6 h	27%	30%
	0-24 h	49%	46%
Mod-Severe Pain, 0-24 h		35% *	61%

NSD Postop Side Effects, 0-24h (↑disturbed sleep)

TCI PFL 2-4 µg /ml, ~ 450 µg Fentanyl, O2-Air, Cis

Quaynor H, Raeder J, Acta Anaesth Scand 2002;46:109-13.

Efficacy: Repeat Dose Ondansetron

Ondansetron 4 mg to all before induction

Pts w PONV randomized to Tx.

% Complete control

	n=2199	n=214	
	<u>Proph Ond</u>	<u>Tx Ond</u>	<u>Tx Placebo</u>
0-24h	64%	32%	28%

(NS)

No difference in severity or duration of nausea

Kovac AL et al. J Clin Anesth 1999;11;453-9.

Ondansetron Dose for Treatment

Early PONV <6h, Complete control

		<u>Ondansetron</u>		<u>Placebo</u>	
1 mg	DuPen 74/130	57%	39/129	30%	
4 mg		73/119	61%	“	
8 mg		70/122	7%	“	
8 (3 combined)		101/175	58%	47/183	26%

Tramer M. BMJ 1997;314:1088-92.

Prevention and Treatment of Postoperative Nausea and Vomiting

Multiple causes: pt, surgery, anesthetic

No “magic bullet”, for Px or Tx

Need to minimize the provoking stimuli

to make antiemetic drugs more effective

Still, more questions than final answers:

drug combinations? timing?

duration of effectiveness?

III Managing the Recovery Process

Fast Tracking Recovery:

“Bypassing PACU 1”

Define what YOU mean

Options depend 1° on physical factors:

facility layout patient flow

Interaction of physical/facility and nursing effort

Fast Tracking Recovery:

Different Intensities of Care

Nursing care ratio 1 : 1

Typical PACU 1

Nursing care ratio 1 : 3

ASU PACU “1”

Nursing care ratio 1 : 6

PACU 2/ Stepdown Unit

Change the Recovery Care Process

Outcome-Based Recovery

rather than time-based

Work with your nurses to identify and solve

THEIR problems

- post-anesthesia; administrative

Educate and prepare

surgeons and patients

BWH Criteria for Fast-Tracking

(Discharge or Bypass Phase 1) :

Awake

Vital signs stable

SpO₂ ≥ 92% on room air
Minimal pain
Minimal nausea
Able to sit with minimal dizziness

BWH Criteria for Facility Discharge :
Alert and Oriented to Time and Place
Stable Vital Signs
Pain Controlled By Oral Analgesics
Nausea or Emesis Mild If Present
Able To Walk Without Dizziness
No Unexpected Bleeding From Operative Site
Given Discharge Instructions & Prescriptions
Patient Accepts Readiness For Discharge
Adult Present To Accompany Patient Home

Factors Determining Satisfaction with Ambulatory Surgery -- By Postop Patients

#1 Friendliness of OR staff
#2 Surgeon's postop visit in PACU

#3 Management of postoperative pain
#4 Starting your IV smoothly
#5 Avoidance of delays
#6 Speediness of recovery from anesthesia
#7 Family member informed of progress
#8 Treatment of postop nausea & vomiting
Tarazi EM, Philip BK. Amer J Anesth 1998;25:154-7

FAST TRACK RECOVERY

Goal: Patient should be able to return to normal functioning as rapidly as possible.
To do it Safely -- Change the patient outcomes with no change in discharge criteria