

Outpatient Arthroplasty: Setting the Stage for Success

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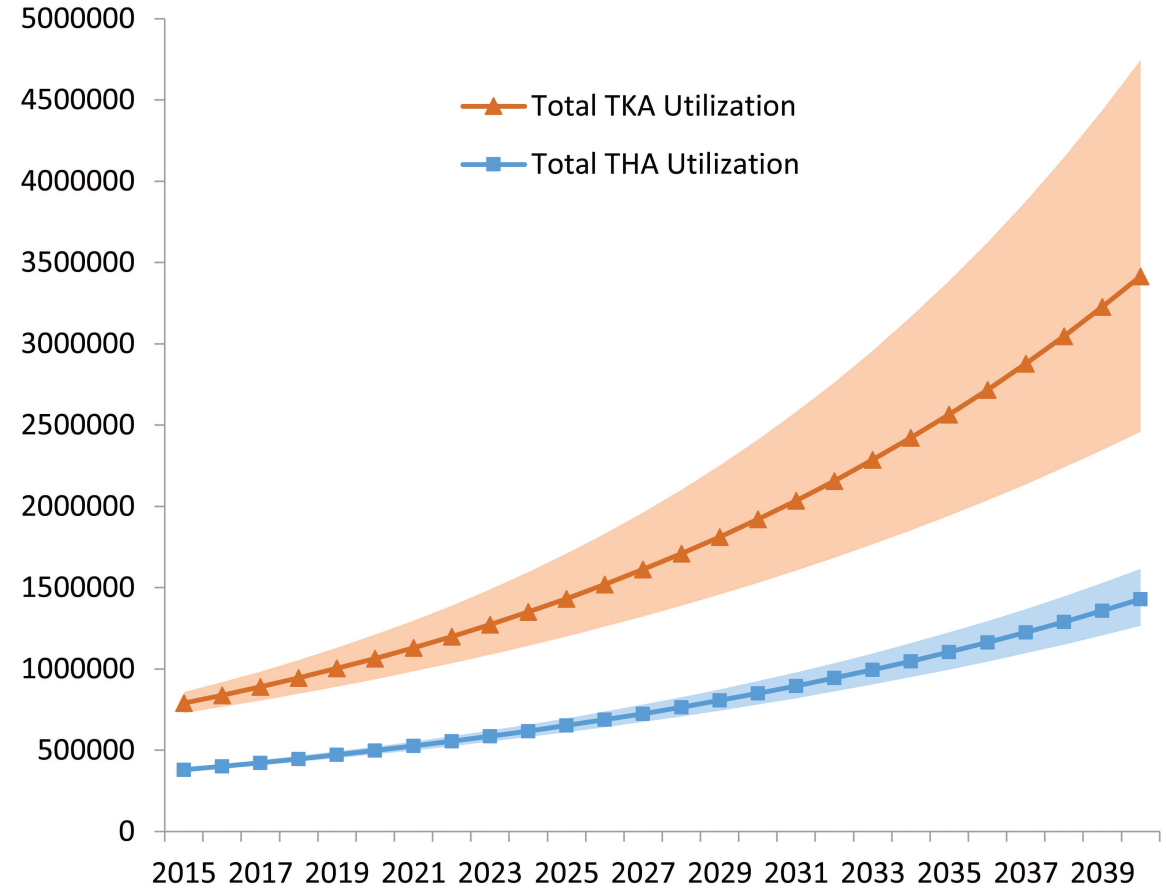
Objectives

- After participating in this session, the audience will be able to
 - Understand the potential benefits and risks of performing arthroplasties on an outpatient basis
 - Identify patients who may be at increased risk of complications after arthroplasty
 - Discuss potential approaches to optimize patient safety in this setting
- I have no financial interests to declare

Summary

- “Outpatient” arthroplasty can provide cost savings and be a convenient route for some patients.
- HOWEVER
 - This does not mean it is easy!
 - Not safest option for every patient!
 - Need pathway for success

Total Joint Replacements



Cost Effectiveness

- Inpatient (lifetime cost for THA)
 - Medicare \$48,155 ± 1673
 - Private \$58,427 ± 1534
- Outpatient
 - Medicare \$43,288 ± 1606
 - Private \$49,972 ± 1411
- Cost per quality-adjusted life year (QALY) favored outpatient THA

Patient Perspective

Would you rather.... 

- Get woken up every 20 min in a hospital room or sleep at home?
- Eat hospital food or your favorite dish?
- Have good coffee on POD1?

Potential Benefits of Outpatient Arthroplasty

- 182 patients – Matched case control
 - 91 outpatients vs 91 inpatients (unclear definition)
- At 2 years:
 - Slightly better modified Harris Hip Score in Outpatients
 - No clinical difference in SF-12 or VAS
- No difference in complications

Safety of Outpatient Arthroplasty

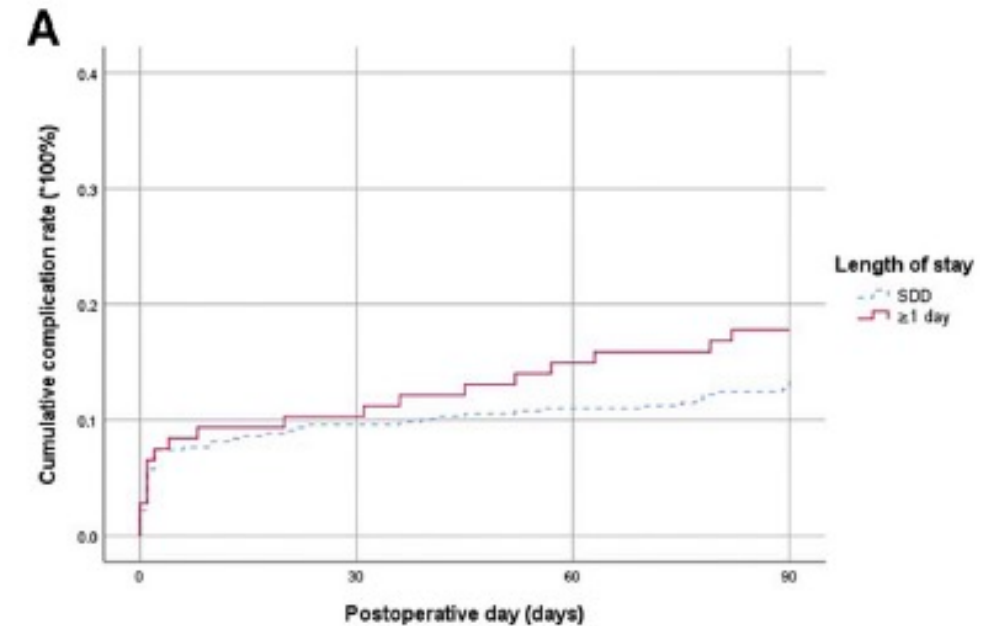
- 366 cases – Matched case-control
 - 183 discharged on POD 0-1
 - 183 discharged on >POD1
- Similar mean age, ASA class, BMI
- ED visits within 90days:
 - Outpatient 3.4% vs Inpatient 6.7% (p=0.214)
 - No difference in admissions either
- Revision TKAs and THAs!

Safety of Outpatient Arthroplasty

- 400 TKA patients – Retrospective case series
 - 125 outpatient (same-day discharge)
 - 275 inpatient
- Outpatients more likely to be
 - Younger (mean age 63 vs 66 yo)
 - Leaner (mean BMI 29 vs 34)
 - Healthier (mean ASA 2.2 vs 2.6)
- No difference in ED visits or readmissions within 90 days

Safety of Outpatient Arthroplasty

- 525 patients – Retrospective case series
 - THAs, TKAs, Unicompartment knees
 - 415 POD0 discharge vs 110 inpatients
- Selection criteria
- Outpatients had lower ASA and more likely to have spinal
- No difference in 90-day complication rate

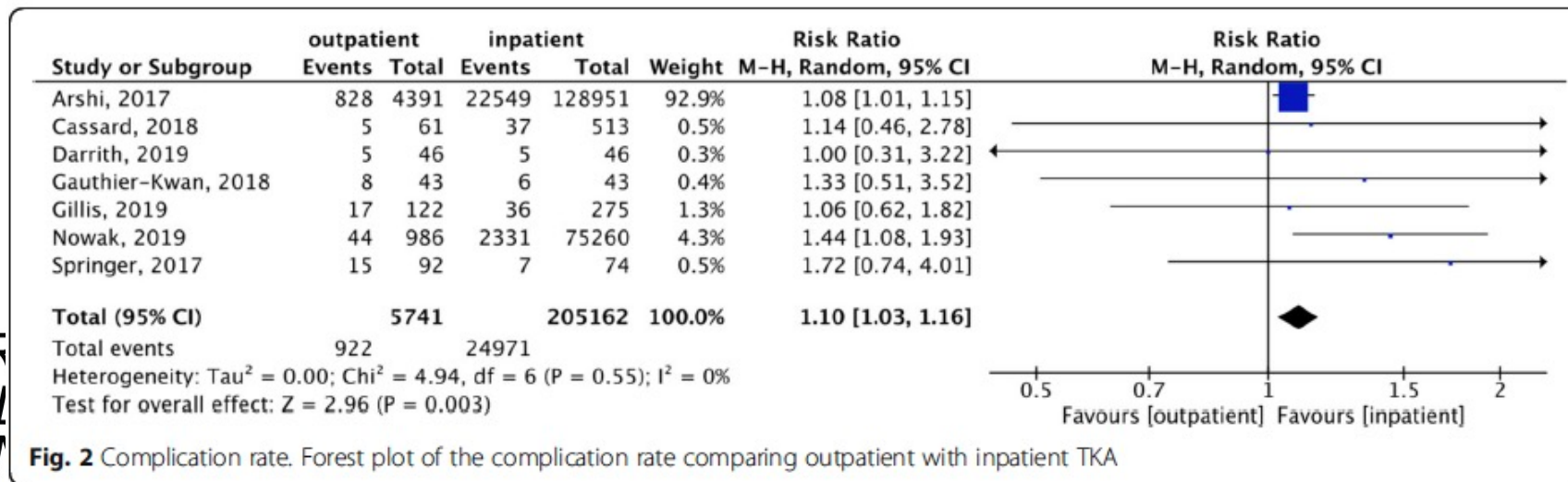


What about this patient?

- 73yo man for TKA
 - History of DVT 5 years ago
 - BMI 35
 - Chronic pain requiring oxycodone 10mg 3 times a day

Not so fast...

- Meta-analysis 8 articles (212,632 patients)
- “Outpatient” not specified
- Some studies had inclusion criteria
- No difference in readmission rate

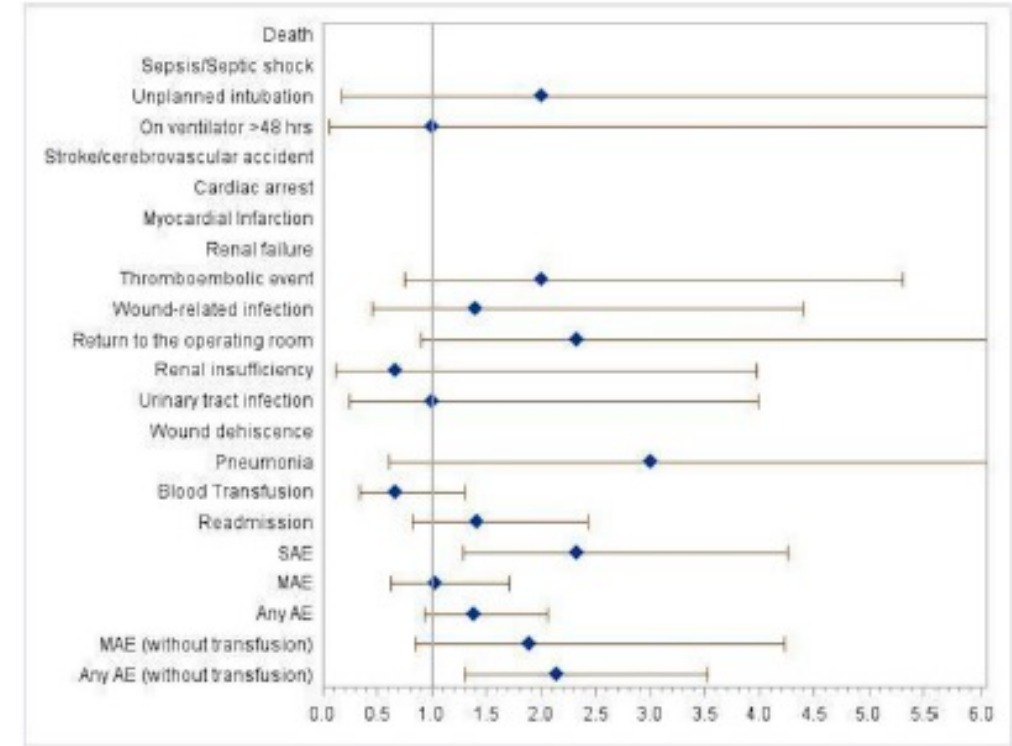


Not so fast...

- 133,342 TKA patients in national Humana database
 - 4,391 outpatient (LOS <24h)
 - 128,951 inpatient
- Mean Charlson comorbidity index (CCI)
 - 2.31 Outpatient vs 2.55 Inpatient ($p < 0.001$)
- After matching, outpatients had higher risk of:
 - Tibial/femoral component revision (OR 1.22)
 - I&D (OR 1.5), Explantation (OR 1.33), Manipulation (1.28)
 - DVT (OR 1.42), renal failure (OR 1.13)

Not so fast...

- NSQIP database
 - 1099 TKA outpatients (LOS <24h) matched to 1099 inpatients
- Matched on anesthesia type also
- Risk difference of serious adverse event 1.82 among outpatients



Practical Considerations

- Patient selection
- Medical optimization
- Patient expectations and education
- Caregiver support
- Outpatient therapy
- Reliable postoperative communication

PATHWAY

DeCook CA. J Arthroplasty 34 (2019) S48-S50.

Dedicated Medical Team

- Anesthesia perioperative surgical home
 - ERAS pathway
 - Anesthesiologists
 - Standardized pain control
 - Discharge and follow-up
- Can decrease median LOS by 1 day

Patient Selection

Table 1
General inclusion and exclusion criteria for outpatient total hip arthroplasty

Inclusion Criteria	Exclusion Criteria
• Age <75 y • ASA < III • Determined discharge destination	• Bleeding disorders • Poorly controlled cardiac conditions (eg, heart failure, arrhythmia) • History of pulmonary embolism • History of respiratory failure • Uncontrolled diabetes mellitus (type 1 or 2) • BMI >30 m²/kg • Chronic opioid consumption • Functional neurologic impairments • Chronic/end-stage renal disease

Day of surgery

- Spinal anesthetic
- Non-opioid systemic analgesia
- Local infiltration analgesia (LIA) by surgeon
- Peripheral nerve blockade
- Opioids when needed
- Nausea prophylaxis
- Dedicated operating room team
- Surgical approach
 - Anterior THA
 - Robotic TKA
- Avoid bladder catheter
 - Scan in PACU
- Physical therapy ASAP

Same-Day Discharge Success Story

- Case series single surgeon 145 DA-THAs at ASCs
- Excluded
 - Age > 70
 - BMI > 35
 - Hx DVT or PE
- Standard education and perioperative pathway/protocol
- Walk 100 ft in PACU
- 4% required overnight stay; <1% required transfer to hospital

Patient selection of same-day discharge

- 325 TKA patients through perioperative surgical home

Mean value	SDD	≥ 1 day	P value
BMI*	29 ± 3.9	32 ± 6.0	0.009
Surgery start (hrs after 7am)	2.5 (1-4)	3 (2-5)	0.024
Allergies*	0 (0-1)	1 (0-2)	0.017
STOP BANG	2.7 ± 1.3	3.3 ± 1.6	0.029

- *factors associated with SDD after multivariate analysis

Outpatient and short-stay THA safety

- 34,416 NSQIP Medicare patients THA
- SDD and 23hr stay patients more likely:
 - Male
 - White
 - Younger (71 vs 74yo)
 - Healthier (BMI, COPD, ASA, albumin)
 - Had spinal anesthetic

Thirty-Day Mortality Rate, Complication Rate, Reoperation Rate, and Readmission Rate.

30 d rates	Same Day (N = 310)	LOS 1 d (N = 5698)	LOS $\geq$ 2 d (N = 28,408)	P-Value
30-d mortality	1 (0.1%)	10 (0.1%)	94 (0.1%)	.152
30-d complication	8 (3%)	171 (3%)	3298 (12%)	<.001
30-d reoperation	8 (3%)	77 (1%)	681 (2%)	<.001
30-d readmission	10 (3%)	145 (3%)	1258 (4%)	<.001

Next-day discharge safer?

- 49,136 Medicare TKA patients
 - Short-stay patients more favorable BMI and comorbidity index
 - DM
 - COPD
 - HTN
 - Low albumin
 - ASA

Table 2
List of Complications Within 30 d of Surgery.

Type of Complication	LOS, 0 d; N = 365	LOS, 1 d; N = 3033	LOS, 2 or More d; N = 45,738	P Value
Postoperative infection (%)	2 (0.5)	22 (0.7)	426 (0.9)	.391
Pneumonia (%)	1 (0.3)	5 (0.2)	211 (0.5)	.052
Unplanned intubation (%)	2 (0.5)	1 (<0.1)	74 (0.2)	.037
Pulmonary embolism (%)	4 (1.1)	6 (0.2)	358 (0.8)	.001
On ventilator over 48 h (%)	1 (0.3)	0 (0)	40 (0.1)	1.000
Renal insufficiency (%)	1 (0.3)	3 (0.1)	55 (0.1)	.659
Renal failure (%)	0 (0)	0 (0)	27 (0.1)	.367
Urinary tract infection (%)	3 (0.8)	13 (0.4)	465 (1)	.006
Cerebrovascular accident (%)	1 (0.3)	1 (<0.1)	58 (0.1)	.253
Cardiac arrest (%)	2 (0.5)	0 (0)	37 (0.1)	.002
Myocardial infarction (%)	3 (0.8)	5 (0.2)	118 (0.3)	.062
Bleeding requiring transfusion (%)	15 (4)	11 (0.4)	347 (5)	<.001
Deep venous thrombosis (%)	3 (0.8)	10 (0.3)	442 (1)	.002
Sepsis (%)	0 (0)	6 (0.2)	96 (0.2)	.675
Septic shock (%)	0 (0)	2 (0.1)	35 (0.1)	.852
Any complication (%)	30 (8)	73 (2)	1172 (9)	<.001

Risk factors for return to OR within 30 days

- 169,406 TKA and THA pts in NSQIP
- Outpatient surgery was NOT a risk factor
- + risk factors
 - TKA
 - Male gender
 - BMI > 35
 - Smoking history
 - Albumin < 3.5 g/dL

Risk of post-discharge complications

- Risk factors for unplanned admission or post-discharge severe adverse event after 23hr stay (or less) THA or TKA

	OR (95% CI)	P value
Age > 80	4.17 (1.81-8.58)	0.0011
History of smoking	1.62 (1.06-2.46)	0.026
Bleeding disorder	2.56 (1.22-5.38)	0.013
Severe adverse event pre-discharge	13.13 (5.1-33.79)	<0.0001
ASA class $\frac{3}{4}$	1.42 (1.01-2.00)	0.046

Reasons for Unsuccessful SDD

- 525 patients outpatient pathway for THA, TKA, or uni TKA
- 21% failure rate for SDD

Reasons for Unsuccessful Same-Day Discharge	UKA (N = 158)	TKA (N = 277)	THA (N = 90)	Total (N = 525)
Postoperative reduced motor function and sensory disturbances	5 (3.2%)	30 (11%)	1 (1.1%)	36 (6.9%)
Pain/fear	8 (5.1%)	4 (1.4%)	4 (4.4%)	16 (3.0%)
Dizziness/orthostatic hypotension	0	11 (4.0%)	8 (8.9%)	19 (3.6%)
PONV	2 (1.3%)	5 (1.8%)	5 (5.6%)	12 (2.3%)
Wound discharge	6 (3.8%)	10 (3.6%)	1 (1.1%)	17 (3.2%)
Other ^a	3 (1.9%)	6 (2.2%)	1 (1.1%)	10 (1.9%)
Total	24 (15%)	66 (24%)	20 (22%)	110 (21%)

How to predict who will do well?

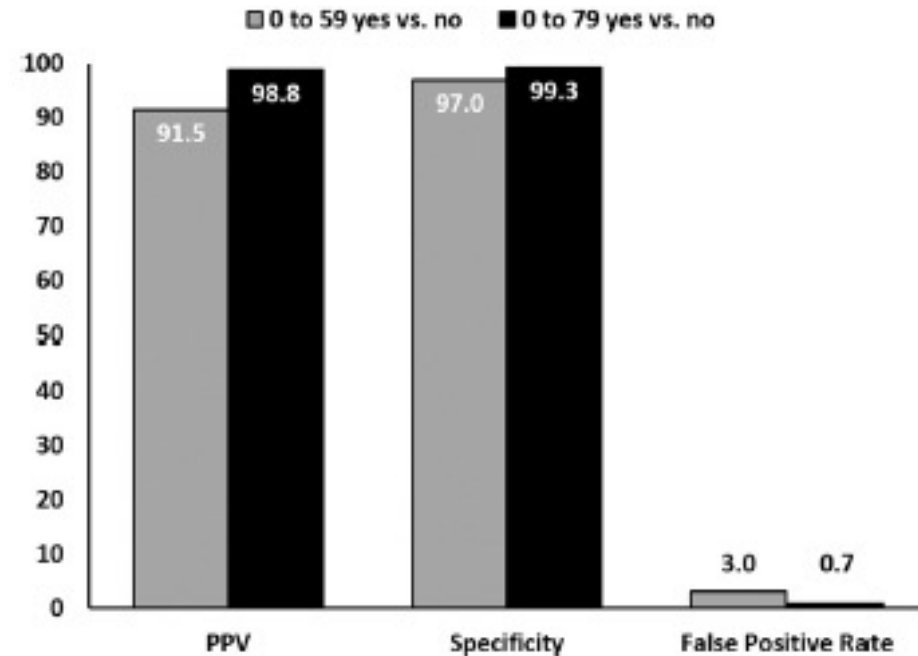
- Outpatient Arthroplasty Risk Assessment (OARA) score
 - Online calculator based on comorbidities
- 1120 arthroplasty patients in early discharge program
- Low/Moderate risk vs High risk
- Cutoff score of 60 had PPV better than ASA (81.6 vs 56.4, $p < 0.001$)

Table 2
OARA Score.

Comorbidity Areas	Possible Points
General medical	180
Hematological	325
Cardiac	385
Endocrine	165
Gastrointestinal	185
Neurologic/psychological	185
Renal/urology	220
Pulmonary	250
Infectious disease	65

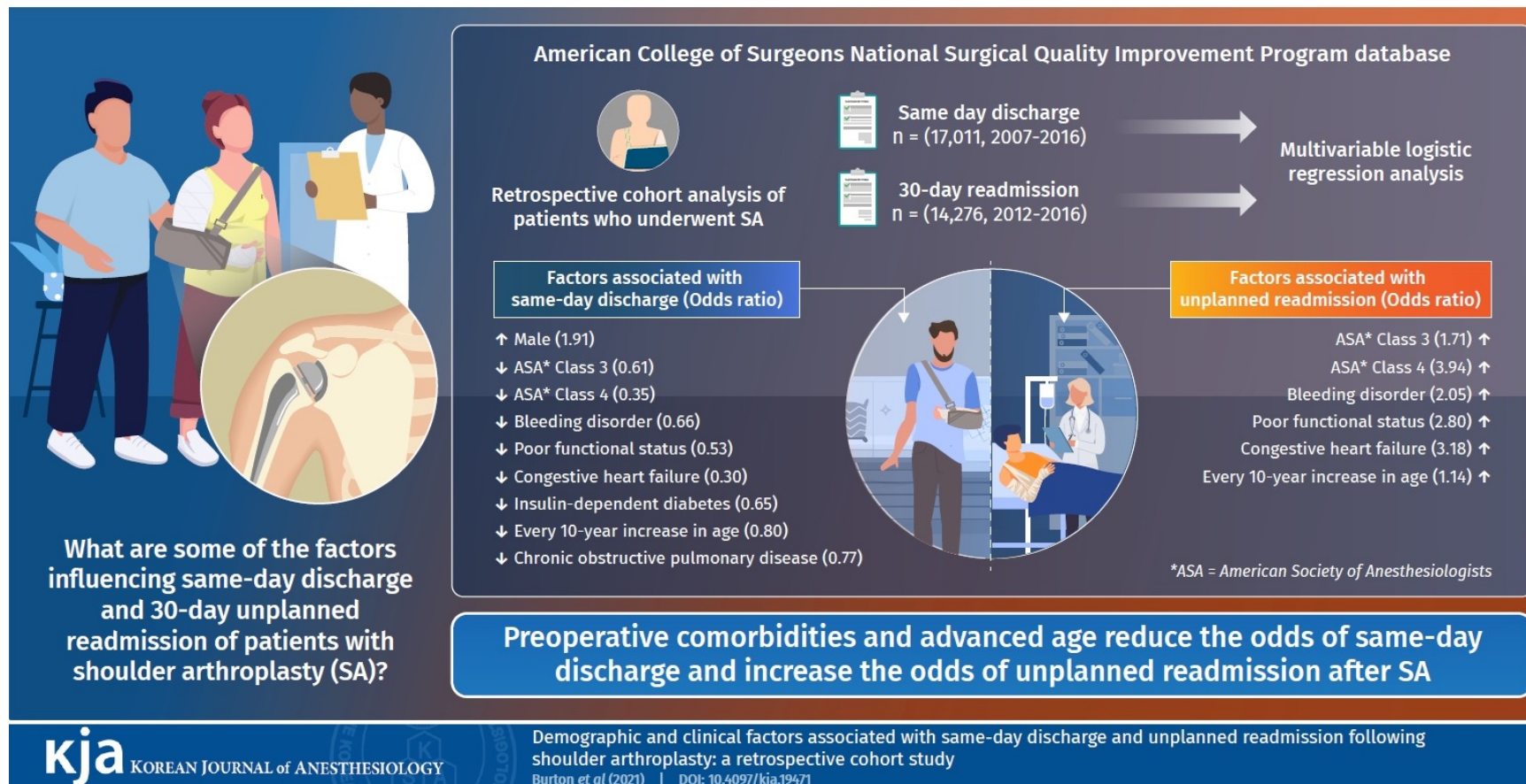
How to predict who will do well?

- 1785 arthroplasty patients
- Assess for same-day discharge predictability
- Cut-off = OARA score 80



Factors for success

Factors Associated with Same-Day Discharge in Patients Following Shoulder Arthroplasty



What about this patient?

- 73yo man for TKA
 - History of DVT 5 years ago
 - BMI 35
 - Chronic pain requiring oxycodone 10mg 3 times a day
- **HIGHER RISK OF NEEDING URGENT CARE!!**

How to maximize chances of success?

- Patient selection
 - Age <65
 - BMI less than 30 or 35
 - Unilateral surgery
 - Patient motivated
- Exclude:
 - A1C > 7
 - ASA 4 or poorly controlled cardiopulmonary comorbidities
 - Cognitive dysfunction
 - Hx thromboembolic disease
 - Renal disease
 - Preop opioid use

Medical optimization

- Possible goals
 - No smoking 8 weeks prior to surgery
 - No aspirin 1 week prior to surgery
 - Hb > 13 g/dL
 - Albumin > 3.5 g/dL
 - Preoperative physical therapy
- Team-based pathway

Patient selection at Mayo Clinic Florida

- Age
- ASA
- Comorbidities
- Social support
- Motivation
- Functional status

Day of Surgery at Mayo Clinic Florida

- Premedication
 - Acetaminophen 1000mg
 - Celecoxib 400mg
 - Dexamethasone 10mg IV
- Regional anesthesia
 - Adductor canal blocks for TKAs
 - PENG or PVB for THAs
- Intraoperative
 - Spinal mepivacaine 60-70mg
 - Minimize midazolam
 - Conservative fluid management
 - PONV prophylaxis
 - Antibiotics and TXA
 - LIA by surgeon
- Postoperative
 - Bladder US scan (if >400ml I/O cath)
 - Discharge to SSU to begin PT

Summary

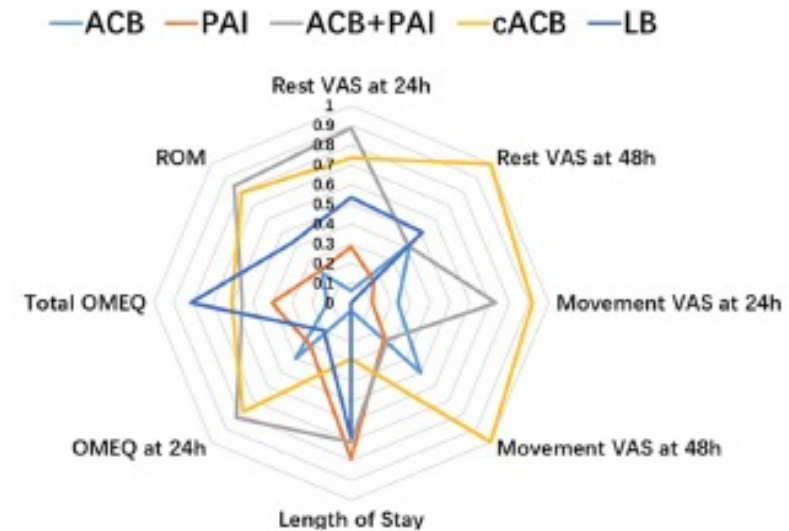
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Liposomal bupivacaine?

Table 4
Average Opiate Administration in MMEs at 24-h Intervals.

	Control n = 638	Protocol n = 939	P
0 to 24 h	38.36 ± 46.57	38.14 ± 45.64	.93
24 to 48 h	18.51 ± 26.11	20.43 ± 43.76	.37
48 to 72 h	18.20 ± 29.92	21.50 ± 55.65	.41
72 to 96 h	16.43 ± 24.28	25.41 ± 76.23	.26
Total	66.37 ± 94.20	69.08 ± 145.81	.68

Values are expressed as ± standard deviation unless otherwise specified.
MME, morphine milligram equivalence.



- No difference in pain scores or PT milestones either among THAs