THE OHIO STATE UNIVERSITY

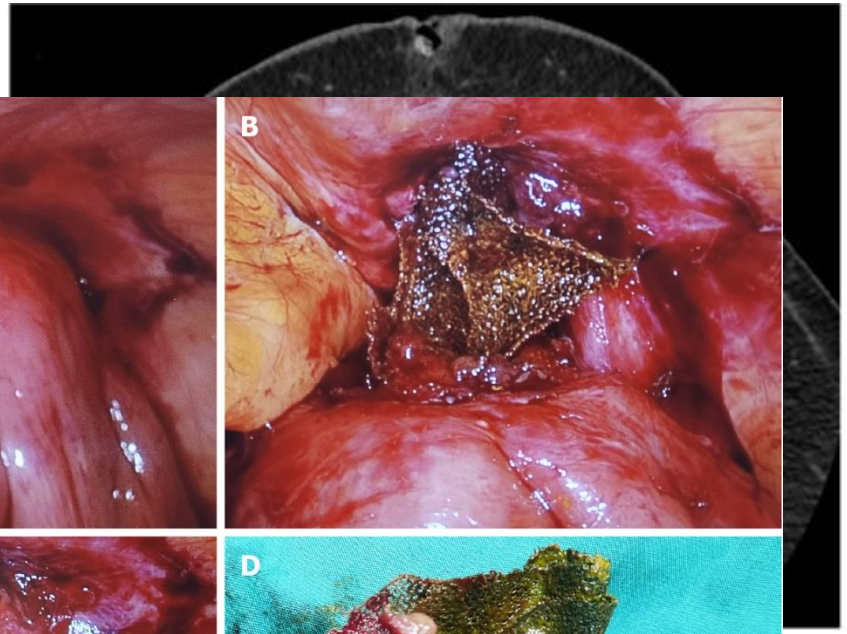
WEXNER MEDICAL CENTER

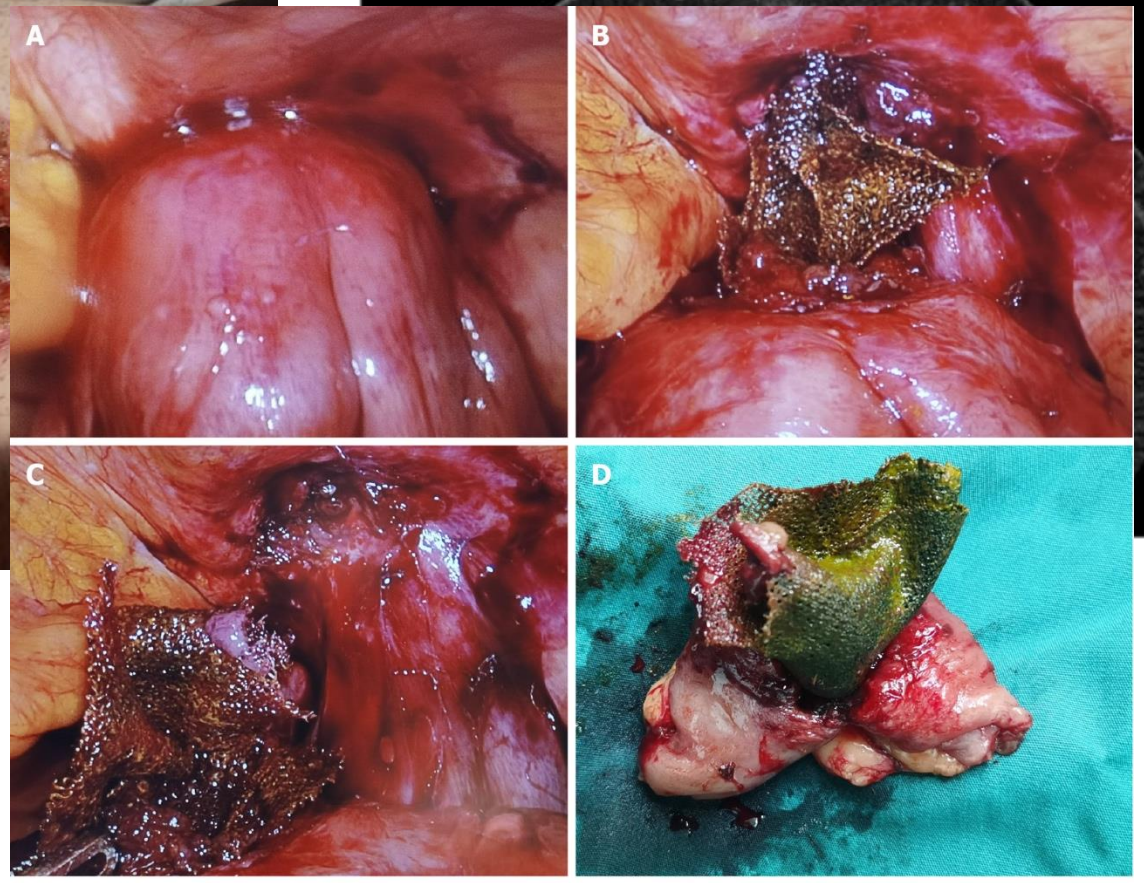
# Optimization: Best Patient Care or Surgical Gatekeeping?

**Courtney Collins MD MS FACS**
**Associate Professor**
**Division of General and Gastrointestinal Surgery**


OHIO STATE
BIG

# Hernia Complications Are Bad







**DOI:** 10.12998/wjcc.v10.i12.3944 

# Current Recommendations

Published online 2021 Sep 27. doi: 10.1093/bjsopen/zrab082 PMID: 34568888

Journal Article

## Perioperative optimization in complex abdominal wall hernias: Delphi consensus statement

T N Grove,[1,2] C Kontovounisios,[1,2,3] A Montgomery,[4] B T Heniford,[5] A C J Windsor,[6] and O J Warren[1,2]

AWR Europe Collaborative

[1] Department of Surgery, Chelsea and Westminster Hospital, London, UK
[2] Department of Surgery and Cancer, Imperial College London, London, UK
[3] Department of General Surgery, Royal Marsden Hospital, London, UK
[4] Department of Surgery, Skåne University Hospital SUS, Malmö, Sweden
[5] Gastrointestinal and Minimally Invasive Surgery, Carolinas Medical Center, Charlotte, North Carolina, USA
[6] HCA Healthcare, London, UK



- BMI < 40 (Ideally 35)
- No nicotine use
- Hgb A1C < 8 (ideally 7.5)

# Through an Equity Lens

- Elective hernia population is disproportionately white, male, and well off
- Women and minorities are significantly less likely to meet cutoffs for surgery
- Low SES patients in particular face barriers preventing optimization
- Surgeons struggle to help patients succeed.

# I can prove it!

hernia repair.

| | Elective, N=69321 (94.2) | Non-Elective, N=4268 (5.8) | |
|---|---|---|---|
| **Patient characteristics** | Number (%) | Number (%) | P-value |
| ***Sociodemographic Factors*** | | | |
| Age, years | | | <0.001 |
| <65 | 44815 (64.7) | 2616 (61.3) | |
| 65-75 | 16228 (23.4) | 877 (20.6) | |
| >75 | 8278 (11.9) | 775 (18.2) | |
| Female | 19590 (28.3) | 2106 (49.3) | <0.001 |
| Hispanic | 7172 (10.4) | 605 (14.2) | <0.001 |
| Race | | | <0.001 |
| American Indian/Alaska Native | 528 (0.8) | 45 (1.1) | |
| Asian | 1561 (2.3) | 82 (1.9) | |
| Black/African American | 7631 (11.0) | 690 (16.2) | |
| Native Hawaiian or Pacific Islander | 188 (0.3) | 9 (0.2) | |
| White | 57187 (82.5) | 3280 (76.9) | |
| Other/Multiple Races | 2226 (3.2) | 162 (3.8) | |
| Payor type | | | <0.001 |
| Private insurance | 31759 (45.8) | 1288 (30.2) | |
| Medicaid/uninsured | 8646 (12.5) | 971 (22.8) | |
| Medicare | 22760 (32.8) | 1627 (38.1) | |
| Other[b] | 6156(8.9) | 382 (9.0) | |

- NSQIP analysis
- All patients undergoing ventral hernia repair. 2022-2023
- Compare sociodemographics and modifiable risk factors of elective vs non elective.
- Elective: Younger, male, white, insured.

| | | | |
|---|---|---|---|
| ***Modifiable Factors*** | | | |
| BMI, kg/m$^2$ | | | <0.001 |
| <18.5 | 406 (0.6) | 49 (0.1) | |
| 18.5-24.9 | 7666 (11.1) | 722 (1.0) | |
| 25-29.9 | 24754 (35.7) | 1128 (26.4) | |
| 30-34.9 | 16833 (24.3) | 937 (22.0) | |
| 35-39.9 | 7666 (11.1) | 562 (13.2) | |
| ≥40 | 4691 (6.8) | 870 (20.4) | |
| ASA class | | | <0.001 |
| I-II | 41932 (60.5) | 1337 (31.3) | |
| III-V | 27389 (39.5) | 2931 (68.7) | |
| COPD | 2340 (3.4) | 309 (7.2) | <0.001 |
| Ascites | 197 (0.3) | 289 (0.4) | <0.001 |
| CHF | 1842 (2.7) | 319 (7.5) | <0.001 |
| Dialysis | 425 (0.6) | 77 (1.8) | <0.001 |
| Smoking | 9726 (14.0) | 853 (20.0) | [illegible] |
| Steroid use | 2500 (3.6) | 231 (5.4) | <0.001 |
| Diabetes | | | <0.001 |
| No | 60190 (86.8) | 3421 (80.2) | |
| Yes, on oral medication | 6887 (9.9) | 534 (12.5) | |
| Yes, on insulin | 2244 (3.2) | 313 (7.3) | |
| Blood Transfusion | 31 (0.04) | 18 (0.4) | <0.001 |
| Albumin <3.5 g/dL | 1597 (2.3) | 752 (17.6) | <0.001 |
| Dependent functional status | 316 (0.5) | 178 (4.2) | <0.001 |

BMI body mass index; ASA American Society of Anesthesiologists; COPD chronic obstructive pu disease, CHF congestive heart failure, [a]Smoking – current cigarette use or use within the last 12
[b]Other payor type – worker's compensation, Tricare, government programs, or charity

# Predictors of Emergent vs. Elective Repair

3.8
Dependent Functional Status

1.2
Age >75

1.9
Female Gender

2.0
ASA Class 3-4

1.6
Hispanic Ethnicity

1.3
Black Race

1.4
Smoking

2.7
BMI > 40

2.0
Non/publicly insured

# What is the Data?

# How Important Is Optimization?

- Analysis of ACHQC 2013-2024
- Ventral hernia repair
- Look at effect of modifiable risk factors on outcomes for elective vs emergent status
- Exposure: BMI, A1C >7.5, Smoking
- Multivariable model adjusting for optimization and elective vs. emergent status
- Primary outcome: surgical complications

| | No, A1C (N=908) | No, BMI (N=3665) | No, BMI & A1C (N=182) | No, BMI Nicotin (N=482) | No, Nicotin (N=6553) | No, Nicotine & A1C (N=123) | Yes (N=54879) | Overall (N=66792) | P-value |
|---|---|---|---|---|---|---|---|---|---|
| **Surgical site infection (SSIs)** | | | | | | | | | |
| No | 873 (96.1%) | 3523 (96.1%) | 72 (94.5%) | 457 (94.8 | 6439 (98.3% | 115 (93.5%) | 038 (98.5%) | 65617 (98.2%) | <0.001 |
| Yes | 35 (3.9%) | 142 (3.9%) | 10 (5.5%) | 25 (5.2% | 114 (1.7%) | 8 (6.5%) | 841 (1.5%) | 1175 (1.8%) | |
| **Surgical site occurrences (SSOs)** | | | | | | | | | |
| No | 793 (87.3%) | 3148 (85.9%) | 57 (86.3%) | 409 (84.9 | 5995 (91.5% | 113 (91.9%) | 341 (93.6%) | 61956 (92.8%) | <0.001 |
| Yes | 115 (12.7%) | 517 (14.1%) | 25 (13.7%) | 73 (15.1% | 558 (8.5%) | 10 (8.1%) | 538 (6.4%) | 4836 (7.2%) | |
| **Pain requiring intervention** | | | | | | | | | |
| No | 70 (7.7%) | 229 (6.2%) | 14 (7.7%) | 24 (5.0% | 209 (3.2%) | 7 (5.7%) | 257 (4.1%) | 2810 (4.2%) | <0.001 |
| Yes | 1 (0.1%) | 11 (0.3%) | 2 (1.1%) | 3 (0.6% | 30 (0.5%) | 2 (1.6%) | 122 (0.2%) | 171 (0.3%) | |

Table 2: Summary of regression results for non-diabetic 30 day SSI model without interaction

| | Odds Ratio | Standard Error | 95% CI | P-value |
|---|---|---|---|---|
| Intercept | 0.01 | 0.30 | (0.01,0.02) | <0.001 |
| BMI | 1.04 | 0.00 | (1.03,1.05) | <0.001 |
| Nicotine use: Yes | 1.26 | 0.11 | (1.02,1.57) | 0.035 |
| Elective case: Yes | 0.43 | 0.17 | (0.31,0.6) | <0.001 |
| Surgical approach: Laparoscopic | 0.30 | 0.19 | (0.2,0.43) | <0.001 |
| Surgical approach: Robotic | 0.25 | 0.13 | (0.19,0.33) | <0.001 |
| Hernia width | 1.09 | 0.00 | (1.08,1.09) | <0.001 |
| Age | 1.00 | 0.00 | (0.99,1) | 0.797 |
| Gender: Female | 1.29 | 0.07 | (1.11,1.49) | 0.001 |
| Race: Non-white | 0.68 | 0.12 | (0.54,0.86) | 0.001 |
| Hypertension: Yes | 1.06 | 0.08 | (0.91,1.23) | 0.459 |
| COPD: Yes | 1.32 | 0.14 | (1.01,1.73) | 0.044 |

Table 6: Summary of regression results for non-diabetic 30 day SSI model based on optimized status

| | Odds Ratio | Standard Error | 95% CI | P-value |
|---|---|---|---|---|
| Intercept | 0.04 | 0.23 | (0.03,0.07) | <0.001 |
| Optimized: No | 1.35 | 0.09 | (1.13,1.59) | 0.001 |
| Elective case: Yes | 0.38 | 0.17 | (0.27,0.54) | <0.001 |
| Surgical approach: Laparoscopic | 0.31 | 0.19 | (0.21,0.45) | <0.001 |
| Surgical approach: Robotic | 0.26 | 0.13 | (0.2,0.34) | <0.001 |
| Hernia width | 1.09 | 0.00 | (1.08,1.1) | <0.001 |
| Age | 1.00 | 0.00 | (0.99,1) | 0.242 |
| Gender: Female | 1.31 | 0.07 | (1.13,1.51) | <0.001 |
| Race: Non-white | 0.68 | 0.12 | (0.54,0.86) | 0.001 |
| Hypertension: Yes | 1.13 | 0.08 | (0.97,1.31) | 0.124 |
| COPD: Yes | 1.31 | 0.14 | (1.01,1.71) | 0.044 |

Table 8: Summary of regression results for 30 day SSI model without interaction

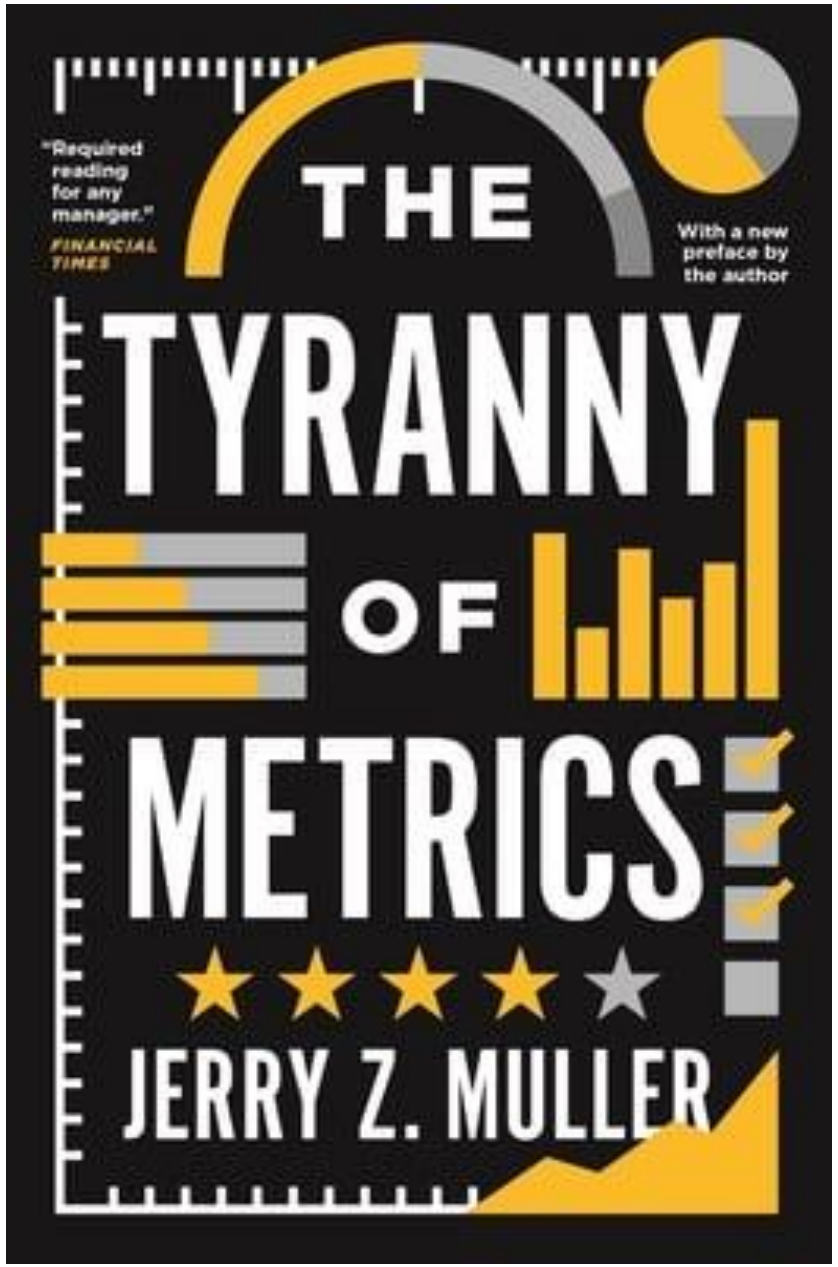
| | Odds Ratio | Standard Error | 95% CI | P-value |
|---|---|---|---|---|
| Intercept | 0.01 | 0.28 | (0.01,0.02) | <0.001 |
| BMI | 1.04 | 0.00 | (1.03,1.04) | <0.001 |
| Nicotine use: Yes | 1.33 | 0.10 | (1.09,1.62) | 0.004 |
| Elective case: Yes | 0.50 | 0.16 | (0.36,0.68) | <0.001 |
| Surgical approach: Laparoscopic | 0.33 | 0.17 | (0.24,0.45) | <0.001 |
| Surgical approach: Robotic | 0.28 | 0.12 | (0.22,0.35) | <0.001 |
| Hernia width | 1.08 | 0.00 | (1.07,1.09) | <0.001 |
| Age | 1.00 | 0.00 | (0.99,1) | 0.674 |
| Gender: Female | 1.37 | 0.07 | (1.2,1.56) | <0.001 |
| Race: Non-white | 0.75 | 0.10 | (0.61,0.91) | 0.004 |
| Diabetes: Yes | 1.37 | 0.09 | (1.14,1.63) | 0.001 |
| Hypertension: Yes | 1.10 | 0.07 | (0.96,1.26) | 0.181 |
| COPD: Yes | 1.36 | 0.12 | (1.08,1.71) | 0.008 |

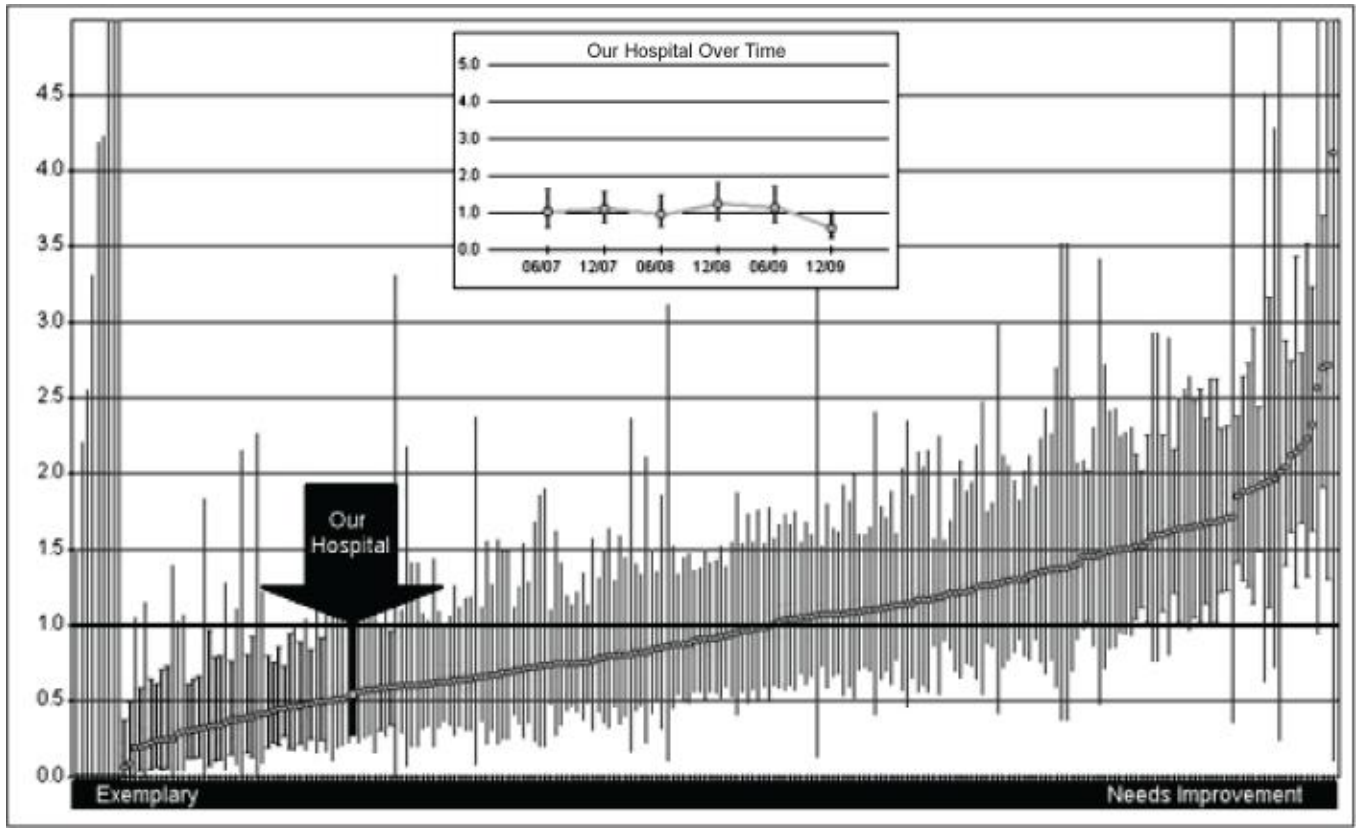


Table 12: Summary of regression results for 30 day SSI model based on optimized status

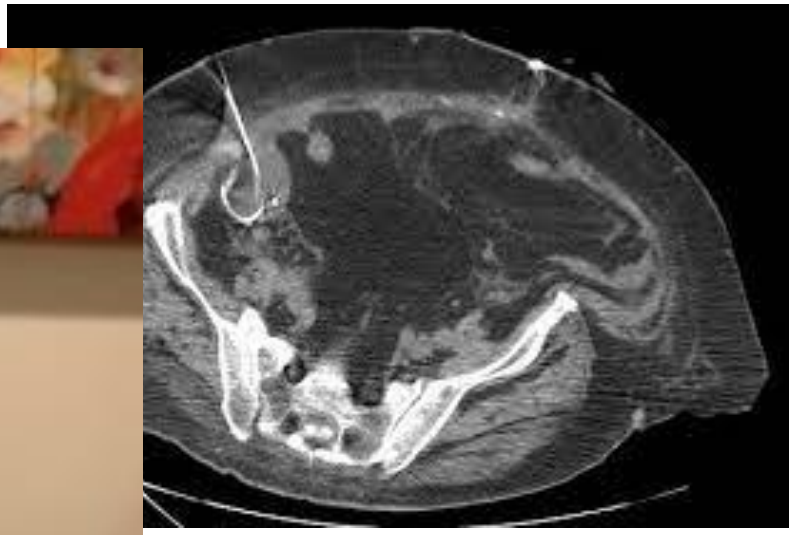
| | Odds Ratio | Standard Error | 95% CI | P-value |
|---|---|---|---|---|
| Intercept | 0.04 | 0.22 | (0.02,0.06) | <0.001 |
| Optimized: No | 1.33 | 0.08 | (1.15,1.55) | <0.001 |
| Elective case: Yes | 0.44 | 0.16 | (0.32,0.61) | <0.001 |
| Surgical approach: Laparoscopic | 0.34 | 0.17 | (0.25,0.48) | <0.001 |
| Surgical approach: Robotic | 0.29 | 0.12 | (0.23,0.37) | <0.001 |
| Hernia width | 1.08 | 0.00 | (1.08,1.09) | <0.001 |
| Age | 1.00 | 0.00 | (0.99,1) | 0.14 |
| Gender: Female | 1.40 | 0.07 | (1.23,1.59) | <0.001 |
| Race: Non-white | 0.74 | 0.10 | (0.61,0.91) | 0.004 |
| Diabetes: Yes | 1.38 | 0.09 | (1.15,1.65) | 0.001 |
| Hypertension: Yes | 1.17 | 0.07 | (1.01,1.34) | 0.032 |
| COPD: Yes | 1.38 | 0.11 | (1.1,1.73) | 0.005 |

| | Yes (N=54879) | Overall (N=66792) | P-value |
|---|---|---|---|
| **Surgical site infection (SSIs)** | | | |
| No | 54038 (98.5%) | 65617 (98.2%) | <0.001 |
| Yes | 841 (1.5%) | 1175 (1.8%) | |
| **Surgical site occurrences (SSOs)** | | | |
| No | 51341 (93.6%) | 61956 (92.8%) | <0.001 |
| Yes | 3538 (6.4%) | 4836 (7.2%) | |
| **Pain requiring intervention** | | | |
| No | 2257 (4.1%) | 2810 (4.2%) | <0.001 |
| Yes | 122 (0.2%) | 171 (0.3%) | |


"Required reading for any manager."
FINANCIAL TIMES
THE
With a new preface by the author
TYRANNY
OF
METRICS
JERRY Z. MULLER


Our Hospital Over Time
5.0
4.0
3.0
2.0
1.0
0.0
06/07
12/07
06/08
12/08
06/09
12/09
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Our Hospital
Exemplary
Needs Improvement


100




*
B

SQUARE

CIRCLE

TRIANGLE

OVAL

RECTANGLE

HEART

# How I think about this

J Am Geriatr Soc. Author manuscript; available in PMC: 2016 Sep 1.

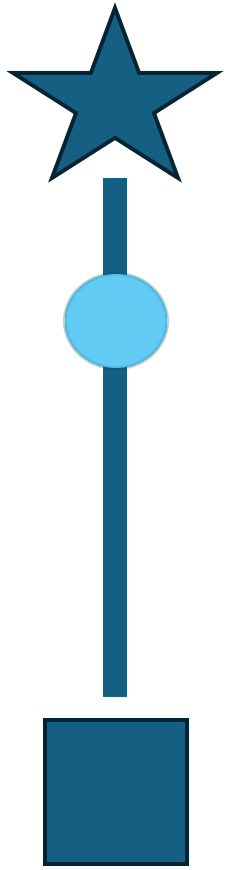
*Published in final edited form as:* J Am Geriatr Soc. 2015 Aug 17;63(9):1805–1811. doi: 10.1111/jgs.13615

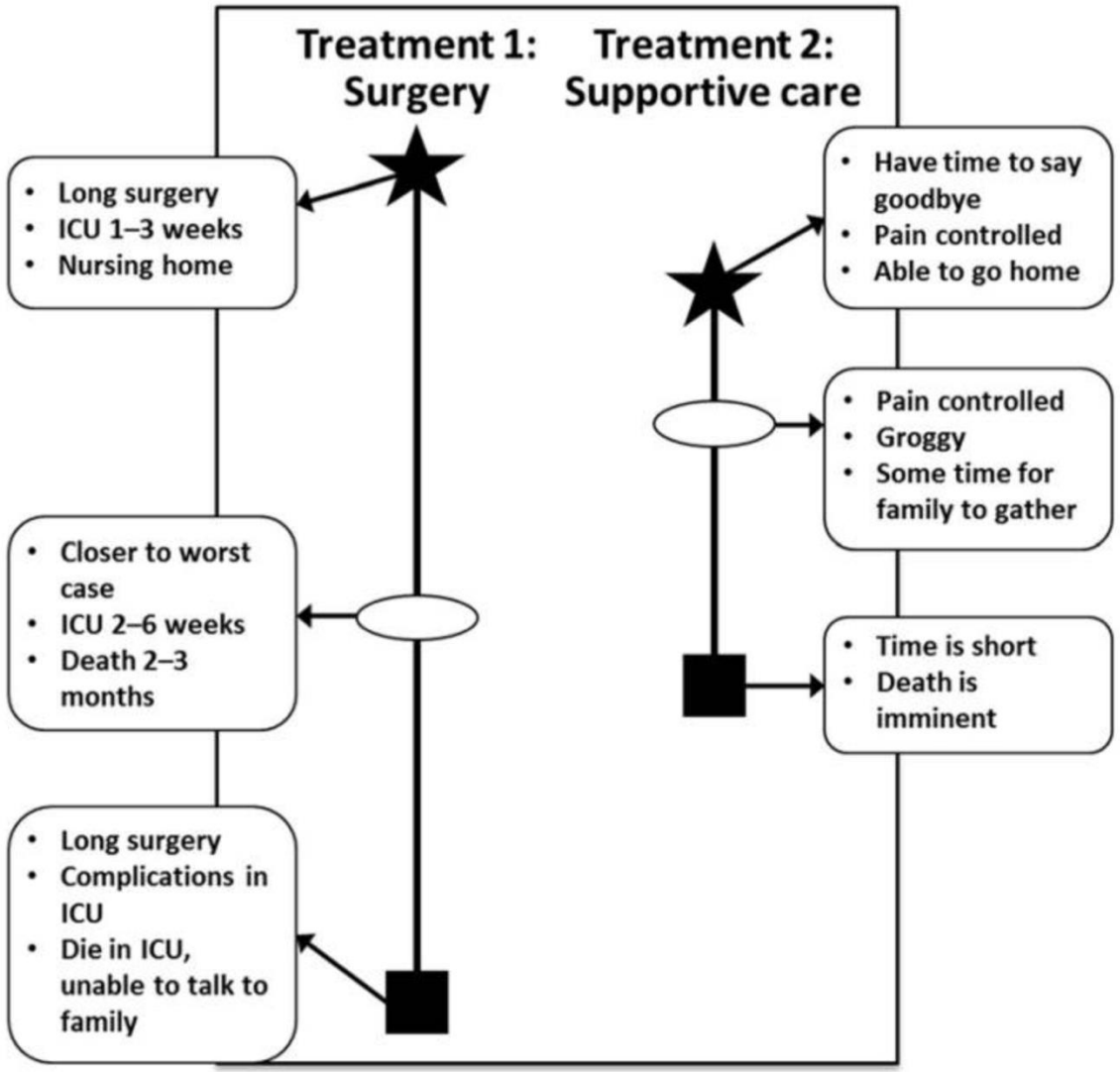
## "Best Case/Worst Case": Qualitative evaluation of a novel communicatior tool for difficult in-the-moment surgical decisions

Jacqueline M Kruser [1], Michael J Nabozny [2], Nicole M Steffens [2], Karen J Brasel [3], Toby C Campbell [4], Martha E Gaines [5], Margaret L Schwarze [2,6]

# It’s Easy!

- Start with a square
  - Worst possible outcome
- Then a star
  - Best outcome
- Draw a Line
  - Length = how bad/good each option is
- Add a circle
  - What do you think is most likely?
- Color it in
  - How sure are you?






85 year old female found down. Large bleeding colon mass invading other structures. Evidence of mets. Continues to bleed.

Totally unexpected, seemed healthy. Has multiple co morbidities. No living will. Family blindsided.

Surgery or not?

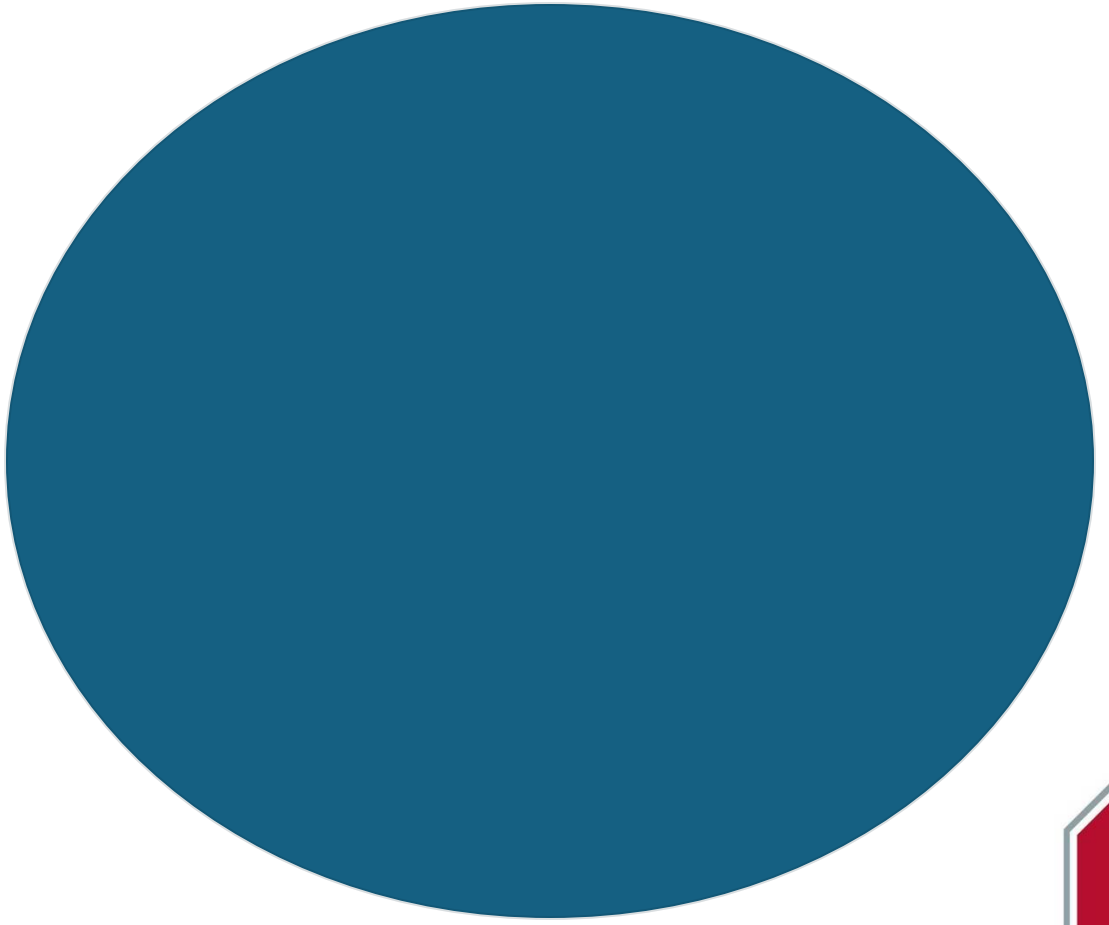
# How many paths do you need?

- Surgery now
- Surgery never
- Surgery. . . sometime
- What kind of surgery?

- Best reasonable outcome
  - What symptoms can you fix?
  - What factors could you change?
- Worst reasonable outcome
  - What complications could you have?
  - What would a hernia emergency look like?

- How good is the good outcome?
  - What symptoms are you addressing?
  - How much better will they get?
- How bad is the worst outcome?
  - How bad would living with the hernia be?
  - What does a complication look like?

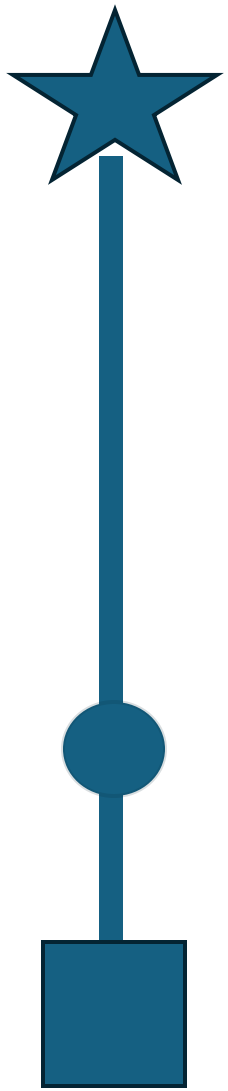
- How likely are they to be optimized?
- How likely is an emergency?
- How likely is a complication in either setting?




EGO TRIPS
EGO TRIPS EVERYWHERE!

Asymptomatic fat/ascites containing inguinal hernia in a 60 year old cirrhotic MELD 26 multiple abdominal surgeries (but no transplant of course).

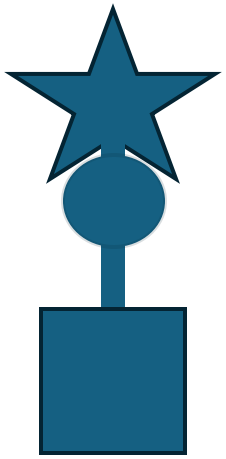
## Surgery



Best case: You feel exactly the same as you do now. . .just with mesh

Worst case: wound infection, leaking ascites, liver failure, death

## No Surgery



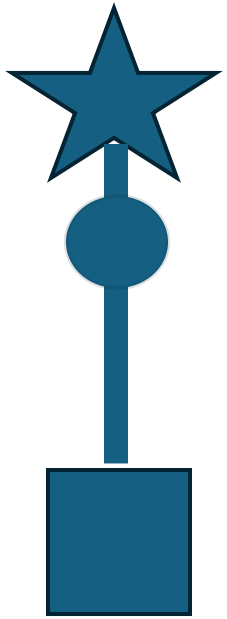
Best case: You live! And feel exactly the same (no mesh tho)

Worst case: Hernia gets worse, incarcerated fat

45 year old diabetic (mostly controlled), former smoker BMI 41 but has lost 150 pounds in 18 months (now plateaued). Ventral hernia with multiple ED visits for SBO, always discharged because “not optimized for surgery”.

- Defect 10cm, BIG sac. Wide rectus muscles
- One prior laparotomy
- Would plan for robo TAR

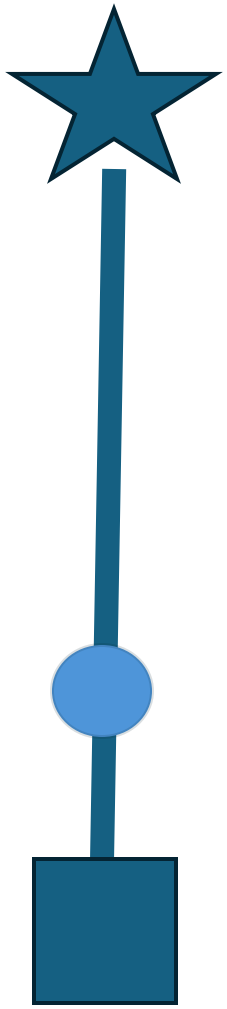
## Surgery



Best case: Gets robo TAR, goes home, does amazing, gets a girl (or boy) and lives happily ever after.

Worst case: Intra op complication, recurrence due to high BMI, have to open and get wound infection

## No Surgery Until Lower BMI

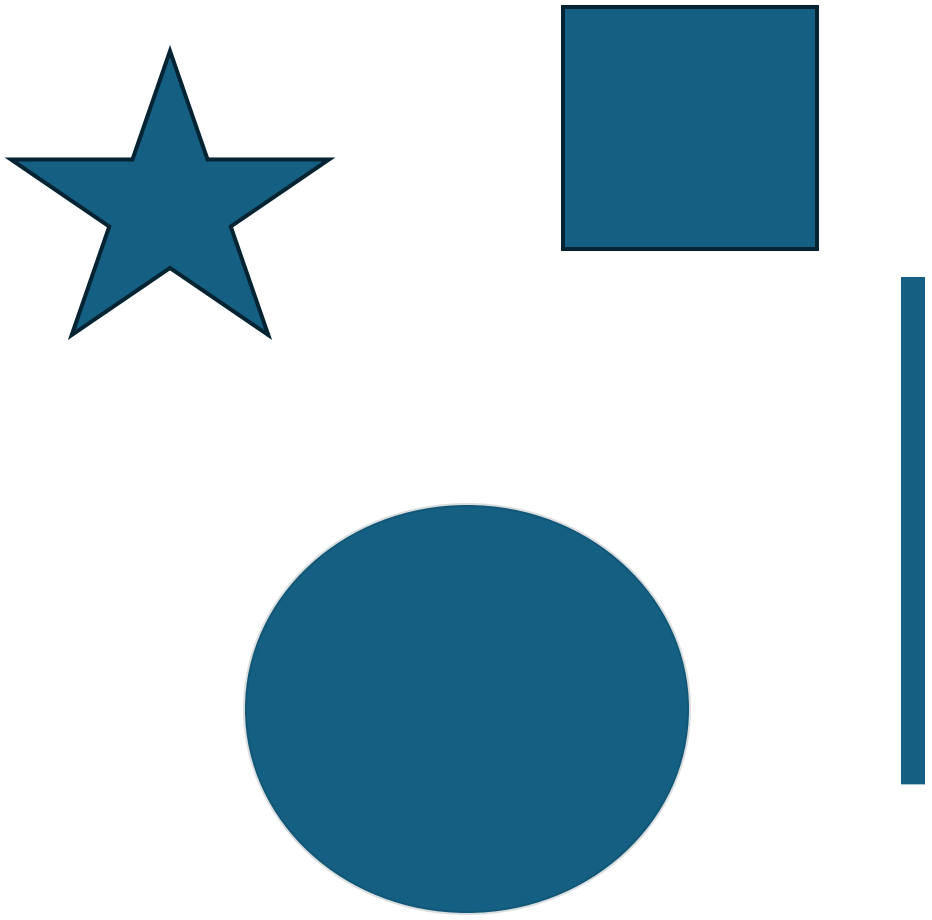


Best case: Able to lower BMI. Same girl but with less chance of complication and very slightly better chance of long term success.

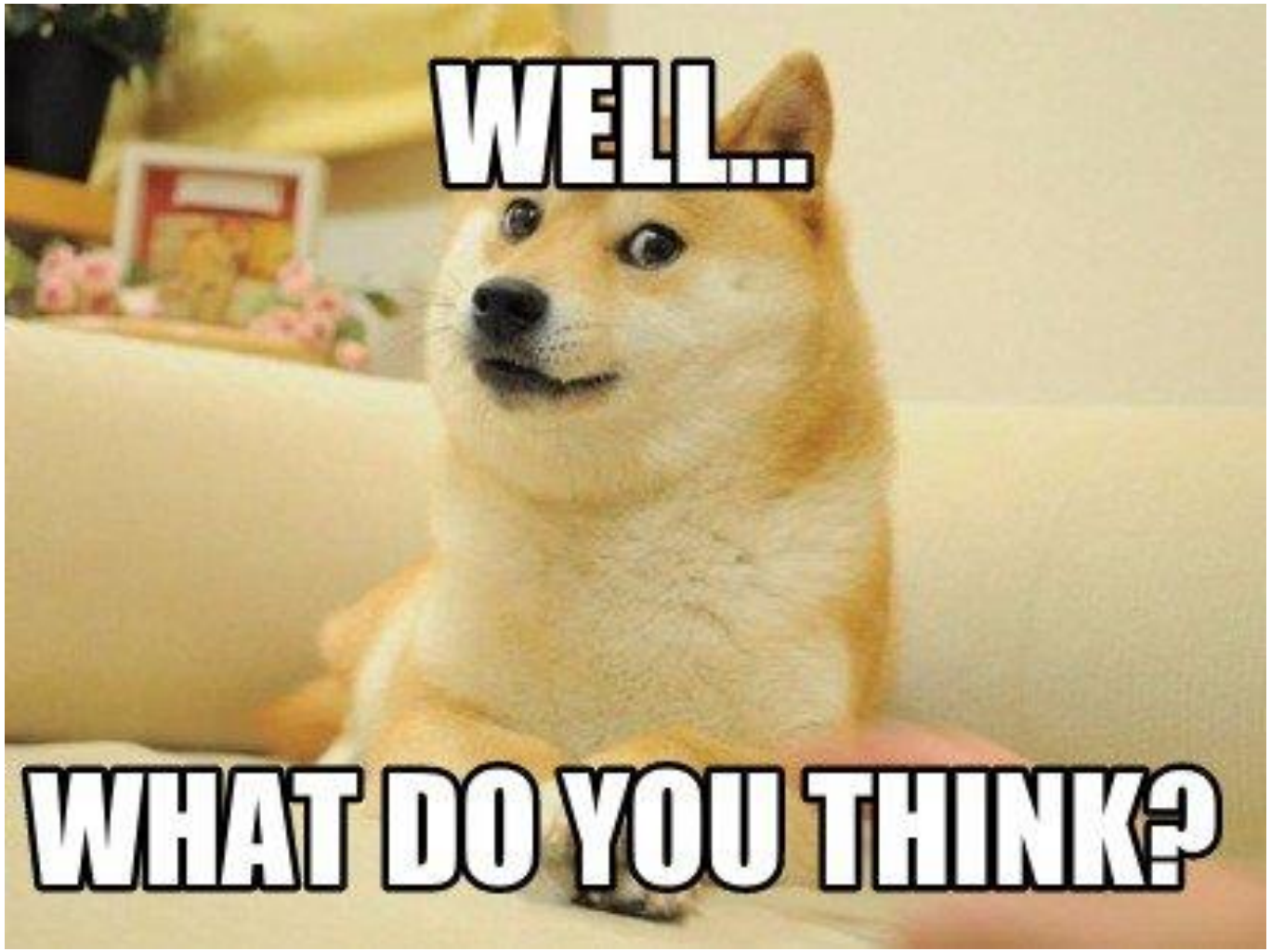
Hernia emergency requiring likely open emergency surgery and further repair delay

# What if. . . ?

- He’s gaining weight?
- He has other co morbidities?
- The hernia just has fat?
- He’d need an open operation?
- Has poor healthcare access?
- He can’t work with the hernia?
- He can’t take time off work to get it fixed?



# The most important question



# Looking to the Future

- More models!
- Look at true cost of complications
- Qualitative work on patient experience with optimization
- How do emergent hernia patients end up in the ED?

# In Conclusion


- Acuity as the 4th risk factor?
- Decisions about hernia repair need to be nuanced
- We can’t forget about the people we say no too
- Complications and surgeries are more than p values

# Thank you!!

Courtney.collins@osumc.edu