



Timing for Surgery in Acute Cholecystitis

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COURSE DIRECTORS:
Robert E. Michler, MD & W. Scott Melvin, MD

The banner features a night cityscape with a bridge and skyscrapers. The text is overlaid on the right side of the image.

Horacio J Asbun MD FACS
Professor of Surgery Mayo Clinic

Timing for Sx in Ac Cholecystitis

Nothing to disclose

Timing for Sx in Ac Cholecystitis

AAST 2012 PLENARY PAPER

No need to wait: An analysis of the timing of cholecystectomy during admission for acute cholecystitis using the American College of Surgeons National Surgical Quality Improvement Program database

Kelli R. Brooks, MD, John E. Scarborough, MD, Steven N. Vaslef, MD, PhD,
and Mark L. Shapiro, MD, Durham, North Carolina

- NSQIP study
- 5,268 patients 5 year period
- All patients admitted with dx of ACC

Timing for Sx in Ac Cholecystitis

TABLE 2. Preoperative Characteristics of Patients Undergoing Emergency Cholecystectomy for Acute Cholecystitis, Stratified by Preoperative Length of Hospitalization

Outcome Variable	Preoperative Length of Stay Before Cholecystectomy					p
	0 d (n = 2,620)	1 d (n = 1,757)	2 d (n = 498)	3 d (n = 204)	>4 d (n = 189)	
Age, mean (SD), y	49.5 (17.7)	52.2 (18.2)	56.4 (19.0)	59.5 (18.0)	61.9 (18.4)	<0.0001
Female	1,578 (60.2)	1,001 (57.0)	277 (55.6)	103 (50.5)	101 (53.4)	0.009
Body mass index, mean (SD), kg/m ²	30.5 (7.7)	30.5 (7.4)	30.2 (7.2)	30.4 (7.0)	29.3 (8.4)	0.28
Nonindependent functional status	128 (4.9)	120 (6.8)	63 (12.7)	32 (15.7)	45 (23.8)	<0.0001
Chronic medical condition	1,370 (52.3)	1,044 (59.4)	346 (69.5)	145 (71.1)	140 (74.1)	<0.0001
Terminal medical condition	39 (1.5)	39 (2.2)	24 (4.8)	9 (4.4)	19 (10.1)	<0.0001
Acute medical condition	110 (4.2)	144 (8.2)	50 (10.0)	37 (18.1)	55 (29.1)	<0.0001
Preoperative sepsis classification						
None	1,881 (72.3)	1,111 (63.5)	308 (62.4)	138 (68.0)	129 (69.0)	<0.0001
SIRS	617 (23.7)	505 (28.9)	121 (24.5)	48 (23.7)	38 (20.3)	
Sepsis	89 (3.4)	109 (6.2)	49 (9.9)	12 (5.9)	13 (7.0)	
Septic shock	14 (0.5)	25 (1.4)	16 (3.2)	5 (2.5)	7 (3.7)	
ASA class ≥ 4	76 (2.9)	96 (5.5)	44 (8.8)	32 (15.7)	37 (19.6)	<0.0001
Abnormal liver function tests	517 (19.7)	455 (25.9)	175 (35.1)	69 (33.8)	58 (30.7)	<0.0001
Resident participation	5,551 (57.3)	3,807 (58.6)	1,683 (61.7)	761 (58.7)	918 (62.0)	<0.0001

Brooks et al, J Trauma Ac Care Surg 2013

Timing for Sx in Ac Cholecystitis

TABLE 3. Operative Characteristics and Postoperative Outcomes for Patients Undergoing Emergency Cholecystectomy for Acute Cholecystitis

Outcome Variable	Preoperative Length of Stay Before Cholecystectomy				
	0 d (n = 2,620)	1 d (n = 1,757)	2 d (n = 498)	3 d (n = 204)	>4 d (n = 189)
30-day mortality	20 (0.8%)	15 (0.9%)	9 (1.8%)	4 (2.0%)	10 (5.3%)
AOR (95% CI)*	Ref	0.57 (0.27 to 1.22)	0.65 (0.27 to 1.66)	0.50 (0.13 to 1.92)	1.19 (0.45 to 3.13)
30-day morbidity	157 (6.0%)	133 (7.6%)	63 (12.7%)	31 (15.2%)	36 (19.1%)
AOR (95% CI)*	Ref	0.90 (0.69 to 1.18)	1.25 (0.87 to 1.77)	1.37 (0.84 to 2.23)	1.45 (0.90 to 2.34)
Open cholecystectomy	427 (16.3%)	375 (21.3%)	144 (28.9%)	63 (30.9%)	70 (37.0%)
AOR (95% CI)*	Ref	1.07 (0.90 to 1.27)	1.33 (1.03 to 1.71)	1.40 (0.97 to 2.01)	1.69 (1.17 to 2.44)
Operative time, mean (SD), min	82 (41)	87 (42)	89 (43)	91 (44)	98 (48)
Beta coefficient (95% CI)*	Ref	2.97 (0.46 to 5.48)	3.77 (-0.23 to 7.77)	7.95 (1.99 to 13.9)	13.6 (7.4 to 19.9)
Postoperative LOS, median (IQR), d	1 (1 to 3)	2 (1 to 3)	2 (1 to 4)	3 (1 to 5)	4 (2 to 7)
Beta coefficient (95% CI)*†	Ref	-0.02 (-0.06 to 0.01)	0.03 (-0.02 to 0.09)	0.10 (0.02 to 0.18)	0.18 (0.10 to 0.26)
Total LOS, median (IQR), d	1 (1 to 3)	3 (2 to 4)	4 (3 to 6)	6 (4 to 8)	9 (7 to 12)
Beta coefficient (95% CI)*†	Ref	0.31 (0.28 to 0.34)	0.56 (0.51 to 0.60)	0.75 (0.68 to 0.82)	1.00 (0.93 to 1.08)

Brooks et al, J Trauma Ac Care Surg 2013

Timing for Sx in Ac Cholecystitis

TABLE 4. Operative Characteristics and Postoperative Outcomes for High-Risk Patients Undergoing Cholecystectomy for Acute Cholecystitis

Outcome Variable	Preoperative Length of Stay before Cholecystectomy				
	0 d (n = 637)	1 d (n = 549)	2 d (n = 208)	3 d (n = 107)	>4 d (n = 120)
30-day mortality	16 (2.5%)	15 (2.7%)	9 (4.3%)	4 (3.7%)	9 (7.5%)
AOR (95% CI)*	Ref	0.68 (0.31 to 1.51)	0.75 (0.29 to 1.98)	0.56 (0.14 to 2.19)	1.03 (0.37 to 2.87)
30-day morbidity	97 (15.2%)	86 (15.7%)	51 (24.5%)	25 (23.4%)	32 (26.7%)
AOR (95% CI)*	Ref	0.82 (0.58 to 1.16)	1.32 (0.86 to 2.02)	1.18 (0.66 to 2.10)	1.29 (0.76 to 2.21)
Open cholecystectomy	222 (34.9%)	189 (34.4%)	84 (40.4%)	44 (41.1%)	56 (46.7%)
AOR (95% CI)*	Ref	0.81 (0.63 to 1.06)	0.98 (0.69 to 1.40)	1.08 (0.68 to 1.72)	1.25 (0.80 to 1.94)
Operative time, mean (SD), min	87 (45)	89 (40)	89 (41)	89 (46)	95 (46)
Beta coefficient (95% CI)*	Ref	0.59 (-4.27 to 5.45)	-1.04 (-7.72 to 5.63)	2.15 (-6.66 to 11.0)	4.38 (-4.07 to 12.8)
Postoperative LOS, median (IQR), d	3 (2 to 6)	3 (2 to 6)	4 (2 to 7)	4 (2 to 7)	5 (2.5 to 10.5)
Beta coefficient (95% CI)*†	Ref	-0.03 (-0.11 to 0.04)	0.03 (-0.07 to 0.12)	0.09 (-0.04 to 0.22)	0.13 (0.01 to 0.25)
Total LOS, median (IQR), d	3 (2 to 6)	4 (3 to 7)	6 (4 to 9)	7 (5 to 10)	10 (7 to 16)
Beta coefficient (95% CI)*†	Ref	0.21 (0.15 to 0.27)	0.41 (0.33 to 0.50)	0.59 (0.48 to 0.70)	0.82 (0.71 to 0.92)

Brooks et al, J Trauma Ac Care Surg 2013

Timing for Sx in Ac Cholecystitis

J Gastrointest Surg (2015) 19:2003–2010
DOI 10.1007/s11605-015-2909-x



ORIGINAL ARTICLE

Acute Cholecystitis—Optimal Timing for Early Cholecystectomy: a French Nationwide Study

Maxime Polo¹ • Antoine Duclos^{2,3,4} • Stéphanie Polazzi² • Cécile Payet² •
Jean Christophe Lifante^{1,2,3} • Eddy Cotte^{1,2,3} • Xavier Barth⁵ • Olivier Glehen^{1,2,3} •
Guillaume Passot^{1,2,3}

- French National Database
- 42,452 patients 507 hospitals
- 3 year study

Timing for Sx in Ac Cholecystitis

Early LC 1-3 days from admission associated with:

- Lower morbidity
- Lower mortality
- Lower readmission
- Lower post op sepsis

Mortality:

Day 0 = 1.4%

Day 1-3 = 0.8-1%

Day 4 = 1.2%

Day 5 = 1.9%

p<0.001

Timing for Sx in Ac Cholecystitis

Early LC 1-3 days from admission associated with:

- Lower morbidity
- Lower mortality
- Lower readmission
- Lower post op sepsis

	Cholecystectomy timing (days)						<i>p</i> value
	0	1	2	3	4	≥5	
Death (%)	1.4	0.9	0.8	1	1.2	1.9	<0.001
Intensive care (%)	5.6	3	3.3	3	3.4	4.5	<0.001
Reoperation (%)	1.2	0.6	0.5	0.5	1.1	1	<0.001
Postoperative sepsis (%)	5.2	3.8	4.1	4	5.7	6.5	<0.001

No need to wait: An analysis of the timing of cholecystectomy during admission for acute cholecystitis using the American College of Surgeons National Surgical Quality Improvement Program database

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Database study - No information on:

- ? When did symptoms started
- ? How was the diagnosis of ACC derived
→ If you admit a patient with a confirmed diagnosis of ACC, don't delay surgery unless there is a REAL reason to delay
- ? Reason for delay from admission to Sx
- ? Patients in which non-op was chosen

Timing for Sx in Ac Cholecystitis

J Gastrointest Surg (2015) 19:848–857
DOI 10.1007/s11605-015-2747-x

ORIGINAL ARTICLE



Early Cholecystectomy Is Superior to Delayed Cholecystectomy for Acute Cholecystitis: a Meta-analysis

Amy M. Cao • Guy D. Eslick • Michael R. Cox

- Metanalysis of prospective RCT
- 14 studies included
- 1608 patients
 - 795 for early group (*sx during first admission*)
 - 813 for delayed group (*sx during second admission conservative rx*)

Timing for Sx in Ac Cholecystitis

	Early	Delayed	P value
Morbidity <i>(number of patients)</i>	15% (96/625)	30% (192/643)	
Relative risk for having a complication	0.66 (95%CI 0.42-1.03)		<i>p=0.07</i>
Morbidity <i>(number of events)</i>	158/630 pts	263/646 pts	<i>p=0.03</i>
BDI	0.15 %	0.44%	<i>p=0.34</i>
Conversion to open	13.4%	15.4%	<i>p=0.28</i>
Wound infection	4.2%	6.2%	<i>p=0.02</i>
Cost	US\$ 10,096	US\$ 13,558	<i>p=0.63</i>

Timing for Sx in Ac Cholecystitis

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ORIGINAL ARTICLE



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Amy M. Cao • Guy D. Eslick • Michael R. Cox

Early LC associated with:

- Reduced total incidence of complications
- Reduced wound infection rate
- No increased risk of BDI or conversion rate
- Decreased cost and hospital stay

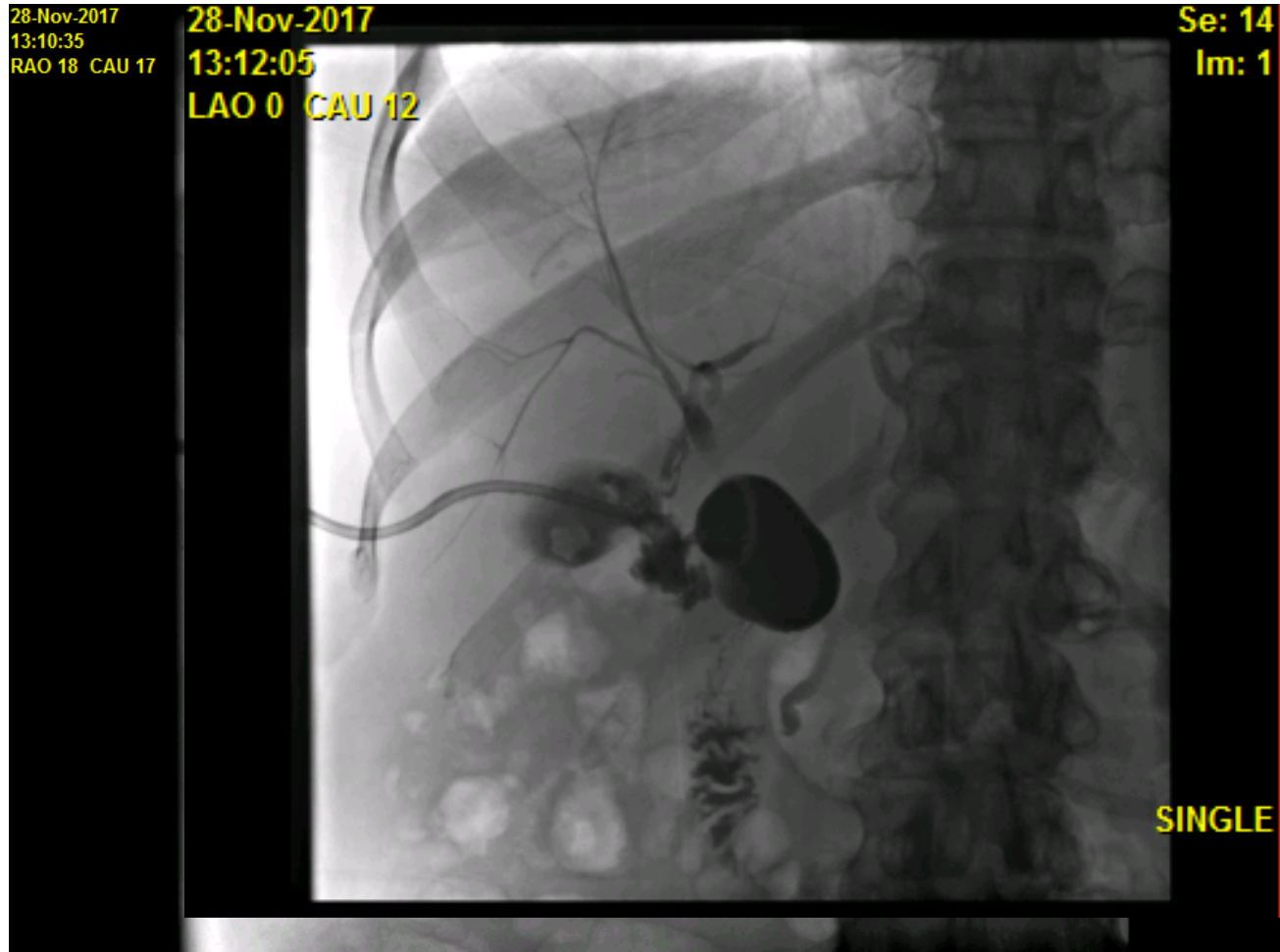
Timing for Sx in Ac Cholecystitis

Cholecystostomy tube

Convenient for the surgeon but:

- *The patient is the one that has to wear it for weeks*
- *Local tube issues are not to be ignored*
- *Timing of surgery not well defined*
- *Not everyone gets to surgery*
- *The subsequent surgery is NOT easy*
 - *Other issues may develop while you wait*

Timing for Sx in Ac Cholecystitis: *Cholecystostomy tube*



Cholecystostomy for Ac Cholecystitis

[JSLs](#). 2015 Jan-Mar; 19(1): e2014.00200.

PMCID: PMC4376213

doi: [10.4293/JSLs.2014.00200](https://doi.org/10.4293/JSLs.2014.00200)

Tube Cholecystostomy Before Cholecystectomy for the Treatment of Acute Cholecystitis

[Kei Suzuki](#), MD, [Margaret Bower](#), MD, [Sebastiano Cassaro](#), MD, [Rajesh I. Patel](#), MD, [Martin S. Karpeh](#), MD, and [J. Michael Leitman](#), MD[✉]

Author	No. Pts PCT ^a	No. of Pts Interval Chole(%)	Planned LC	Conversion (% ^b)	Planned Open C	Mortality (% ^b)	Morbidity (% ^b)
Berber et al, ⁷ 2000	15	13 (87)	11	1 (9)	2	0 (0)	2 (15)
Spira et al, ¹⁶ 2002	55	31 (56)	28	4 (14)	3	0 (0)	0 (0)
Leveau et al, ¹³ 2008	35	3 (9)	3	NR ^a	NR	NR	NR
Paran et al, ¹⁷ 2006	49	28 (57)	25	2 (8)	3	0	4 (16)
Ha et al, ⁹ 2008	65	24 (37)	24	NR	NR	8 (12.3)	NR
Cherng et al, ¹⁹ 2012	185	105 (57)	97	7 (7)	8	8 (4.3)	21 (11.4)
McKay et al, ²⁰ 2012	68	8 (12)	8	3 (38)	0	0	NR
Morse et al, ²¹ 2010	50	11 (22)	7	3 (43)	4	25 (50)	2 (4)
Nikfarjam et al, ²² 2013	32	9 (28)	9	NR	NR	3 (9)	6 (19)
Chang et al, ¹⁰ 2014	60	2 (3)	2	0	0	0	0
Cull et al, ¹⁸ 2014	NR	64	64	10 (16)	0	2 (3)	18 (28)
Present study	82	25 (30)	25	8 (32)	0	0	4 (16)

Cholecystostomy for Ac Cholecystitis

[JSLs](#). 2015 Jan-Mar; 19(1): e2014.00200.

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Tube Cholecystostomy Before Cholecystectomy for the Treatment of Acute Cholecystitis

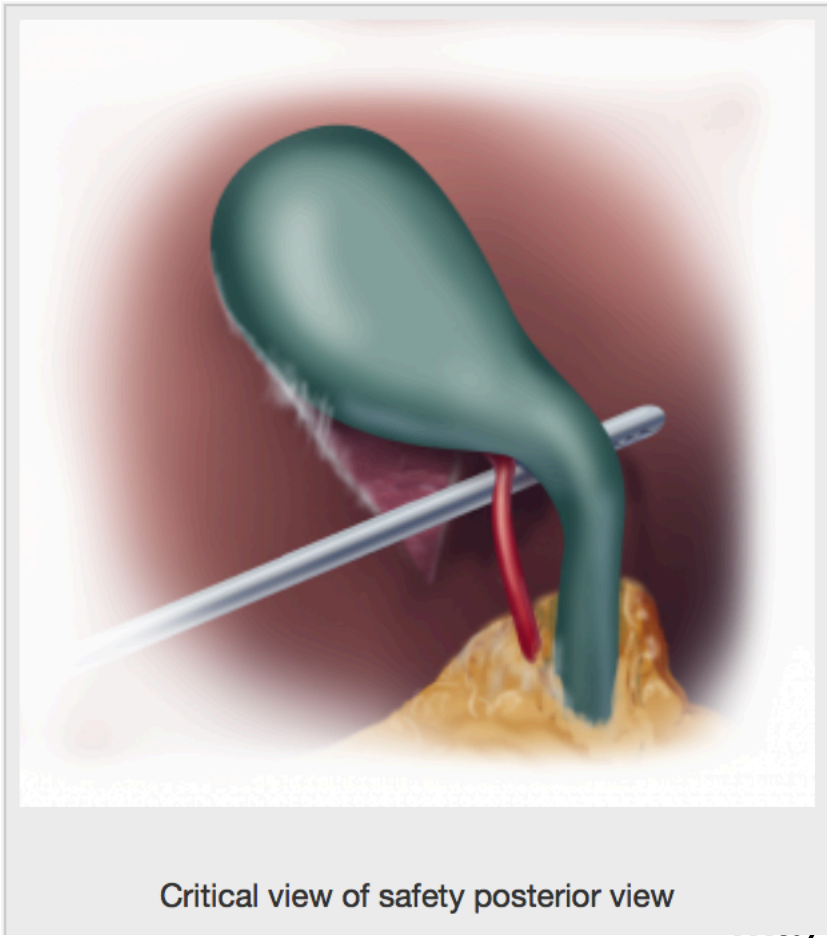
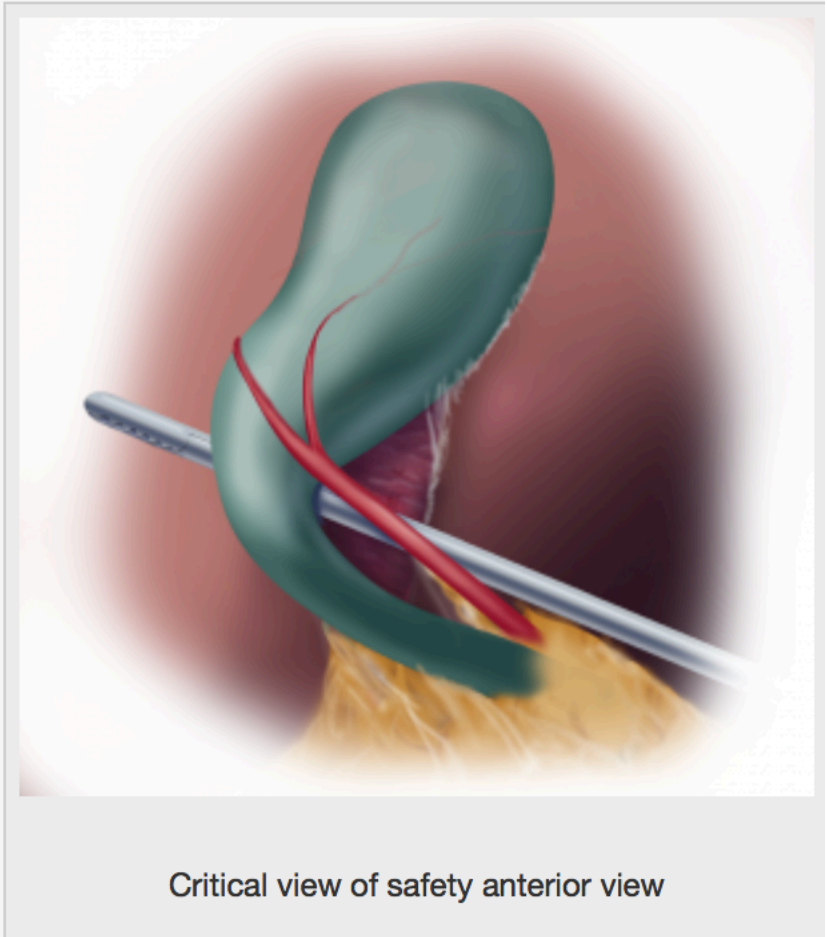
[Kei Suzuki](#), MD, [Margaret Bower](#), MD, [Sebastiano Cassaro](#), MD, [Rajesh I. Patel](#), MD, [Martin S. Karpeh](#), MD, and [J. Michael Leitman](#), MD[✉]

Conclusions:

- *In high-risk patients receiving cholecystostomy tubes only about one third will undergo surgical cholecystectomy.*
- *Laparoscopic cholecystectomy performed in this circumstance has a higher rate of conversion to open surgery and higher hepatobiliary morbidity rate.*

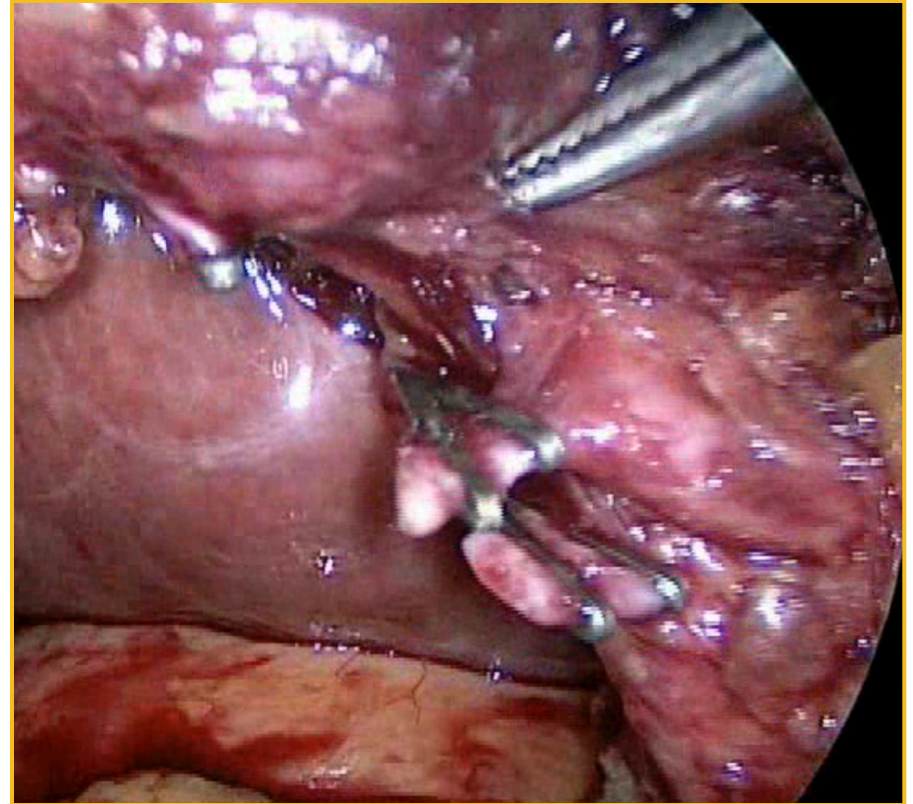
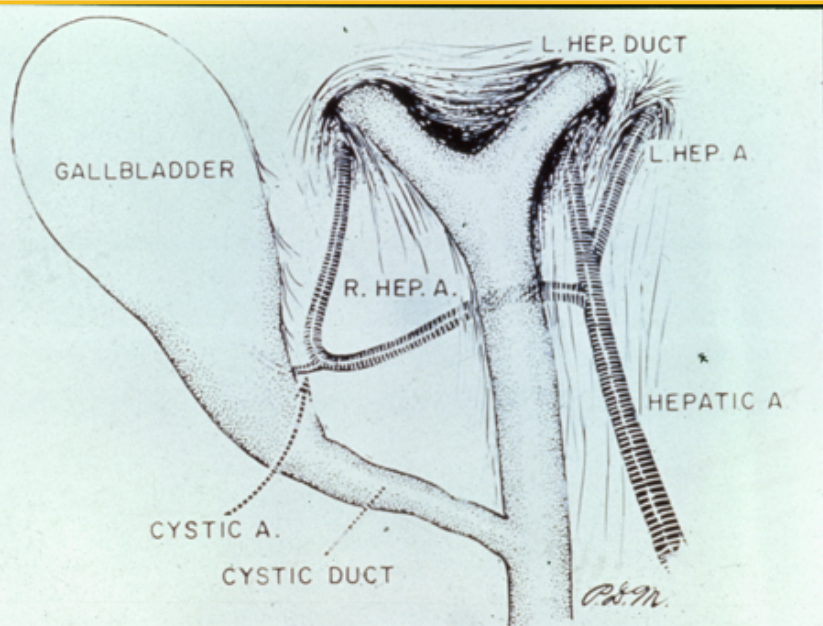
The SAGES Safe Cholecystectomy Program

Strategies for Minimizing Bile Duct Injuries: Adopting a Universal Culture of Safety in Cholecystectomy



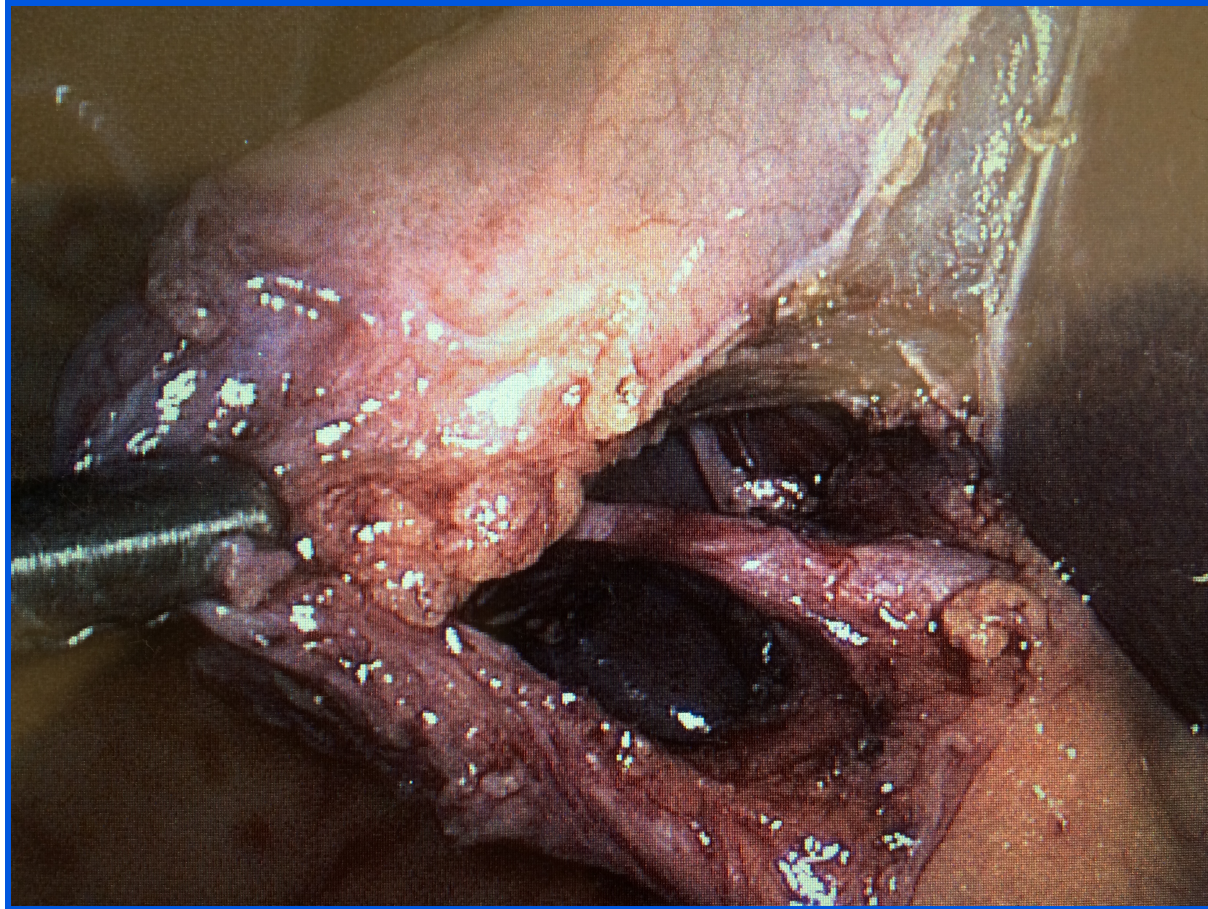
BDI

Preventing vascular injury



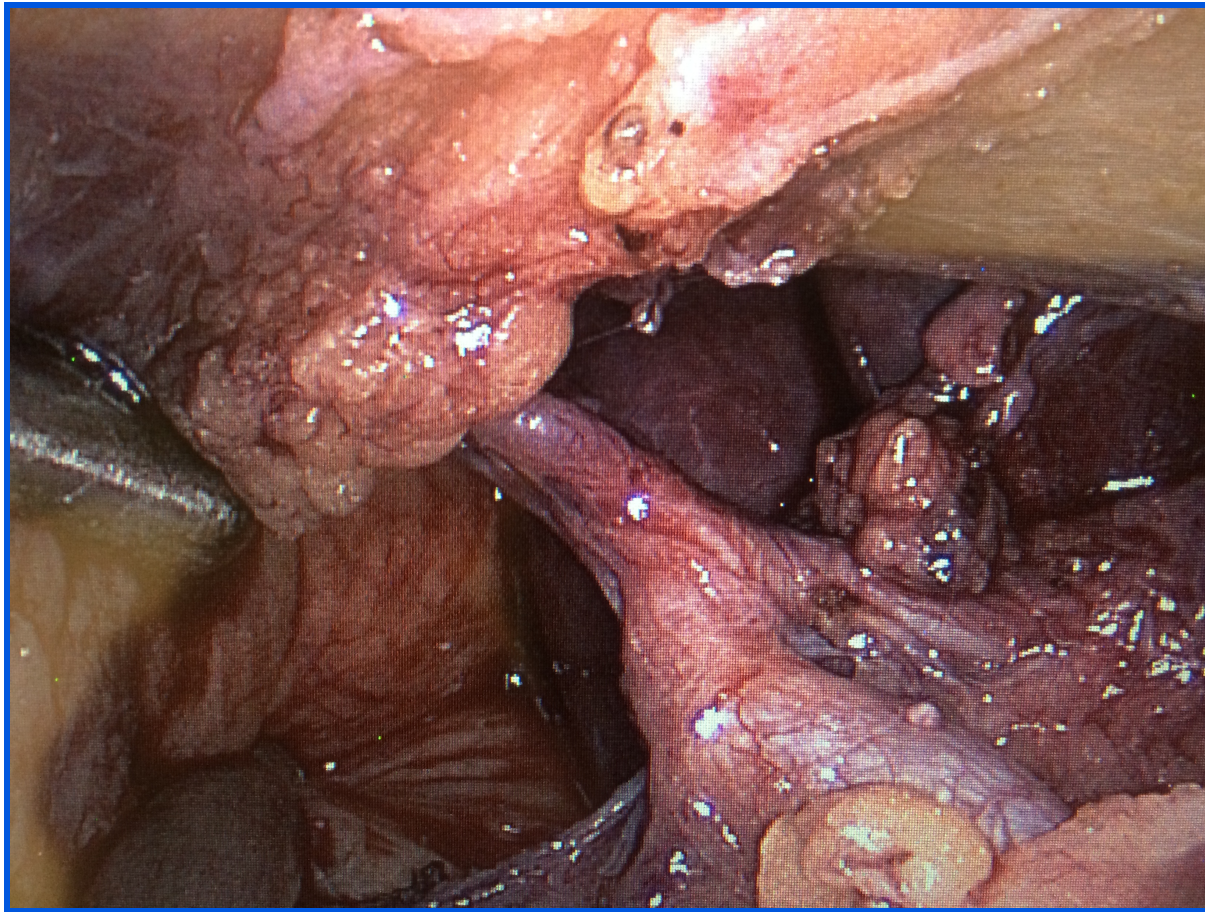
BDI

Preventing vascular injury



BDI

Preventing vascular injury



Timing for Sx in Ac Cholecystitis

To tube or not to tube

Take away lessons

- *Do not do it out of convenience*
- *Understand the consequences to the patient's quality of life*
- *Do not assume a subsequent surgery will be easier*
- *If you are planning to do it, find a real reason*
 - *Know though, it could be a good exit strategy in AC during surgery to avoid BDI*

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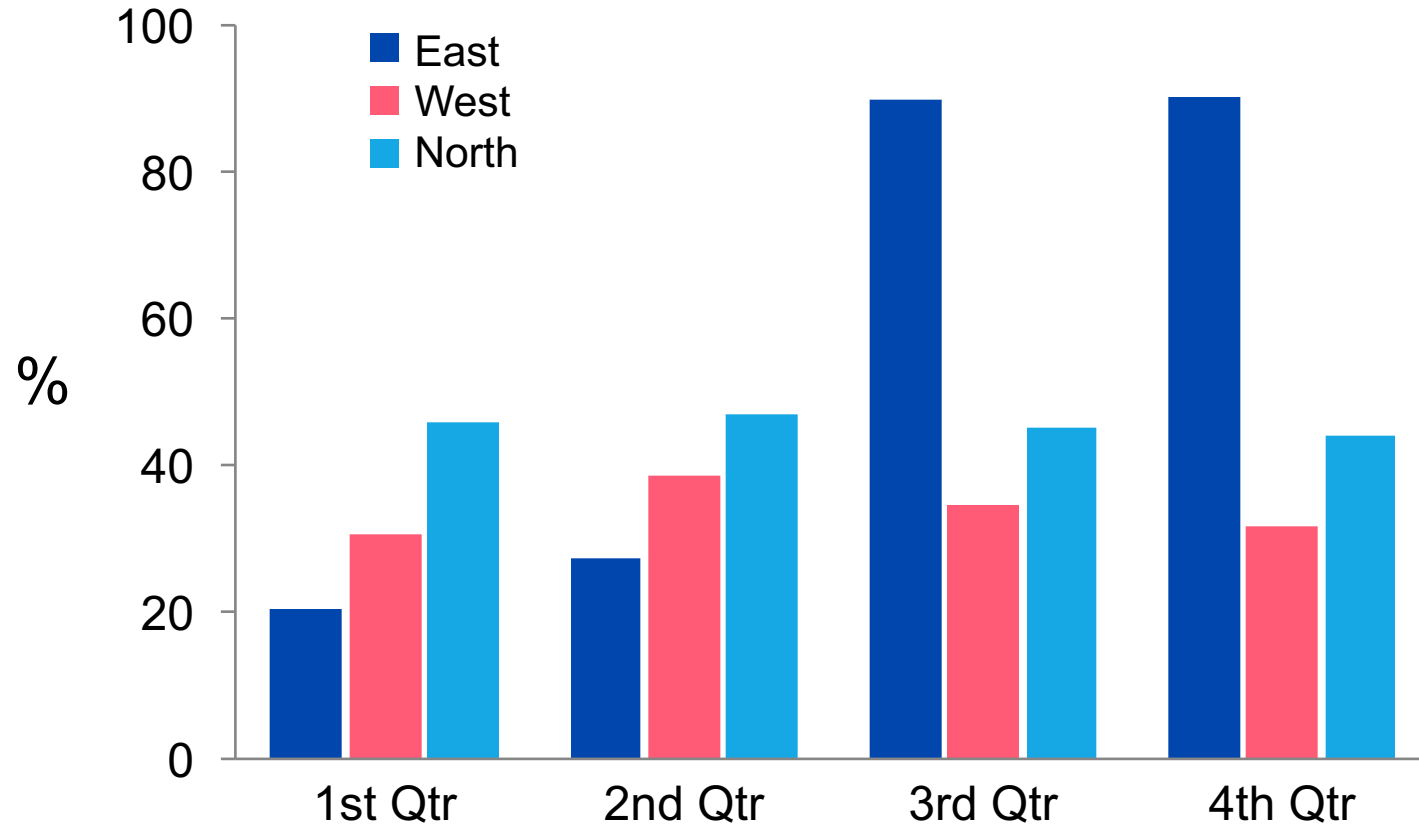
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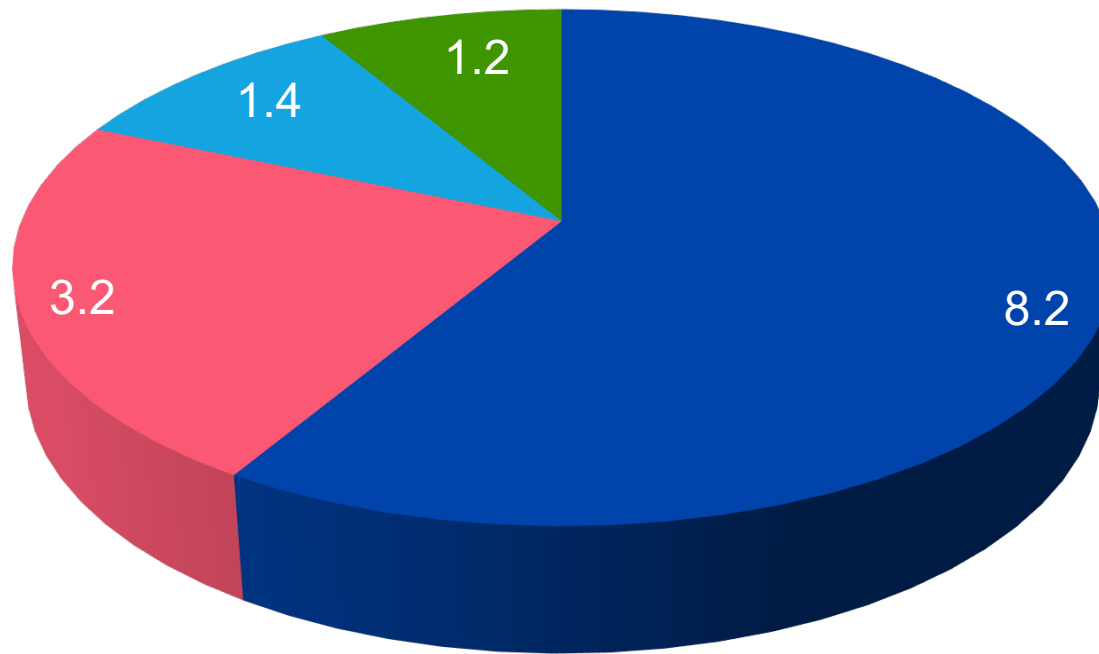
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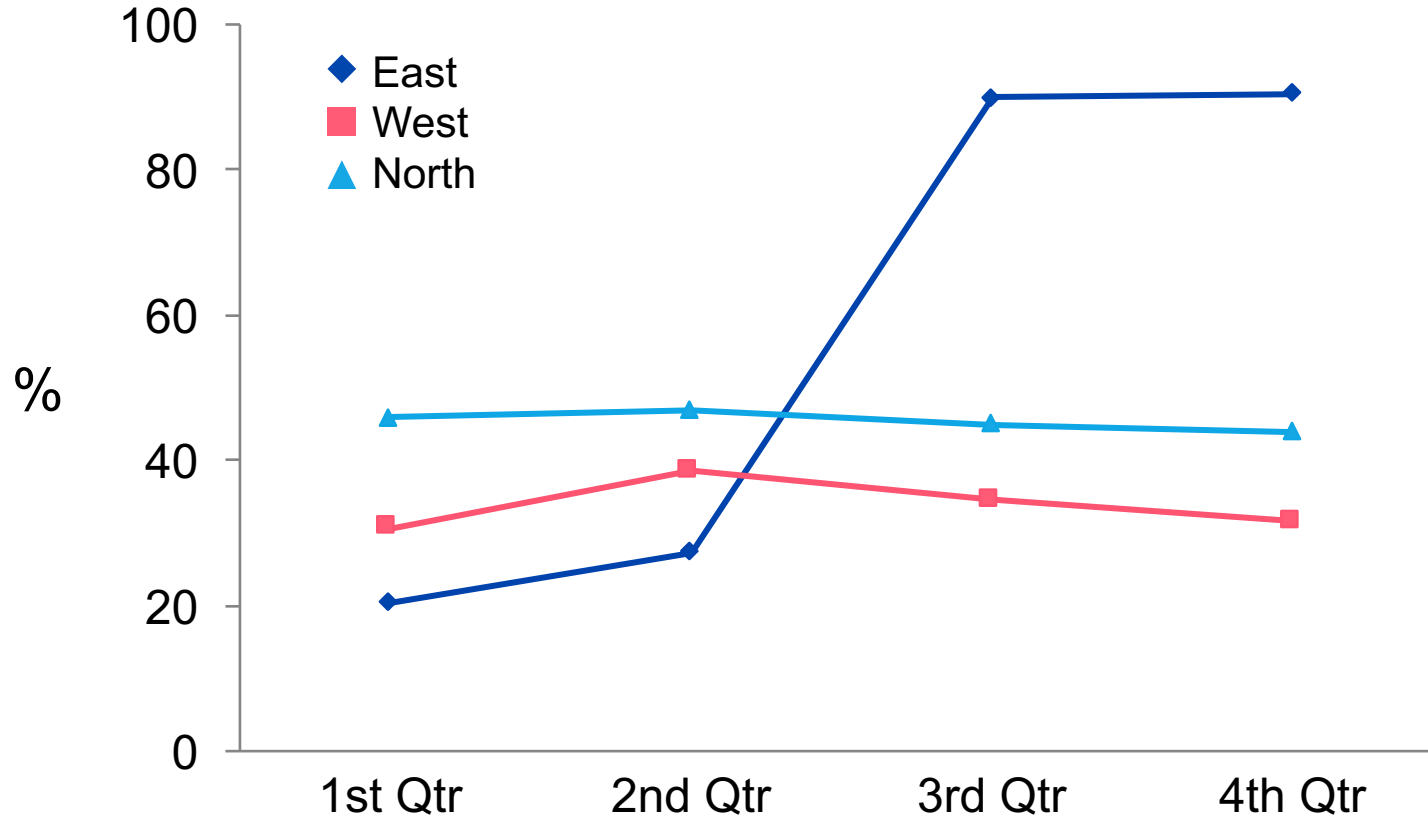
Title for Chart

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Title for Chart

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Microsoft Table

Subtitle for Table

Column 1	Column 2	Column 3	Column 4	Column 5
Row 1	Red	12.3	47%	P<0.001
Row 2	Yellow	459.2	26%	P=0.05
Row 3	Green	56.7	98%	NS
Row 4	Blue	1.0	2%	P>0.01
Row 5	Pink	56.9	14%	P<0.0001
Row 6	Violet	25.4	35%	P=0.01
Row 7	Orange	1,256.2	5%	P<0.001

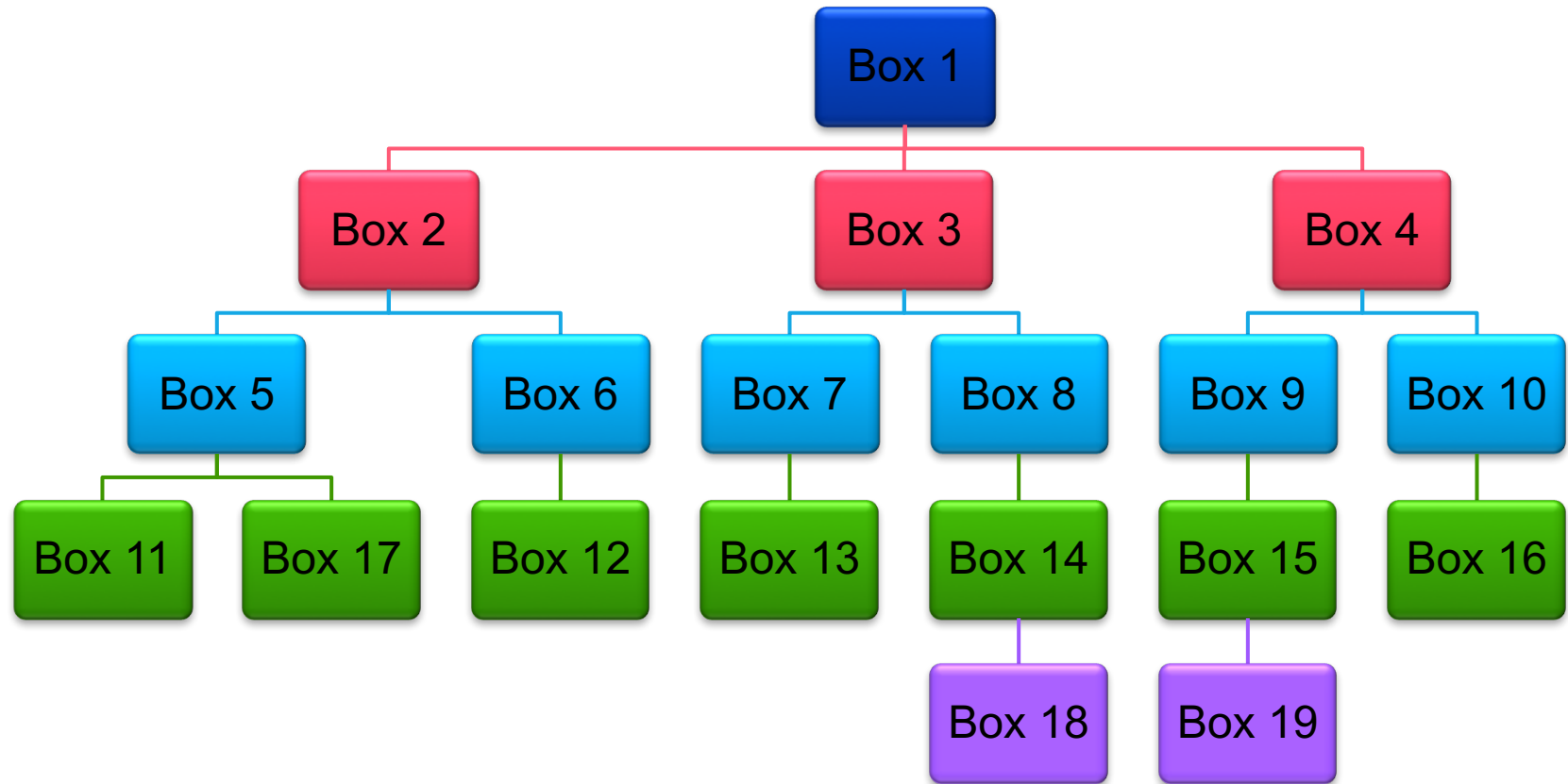
Tabbed Table

Subtitle for Table

Column 1	Column 2	Column 3	Column 4	Column 5
Row 1	Red	12.3	47%	P<0.001
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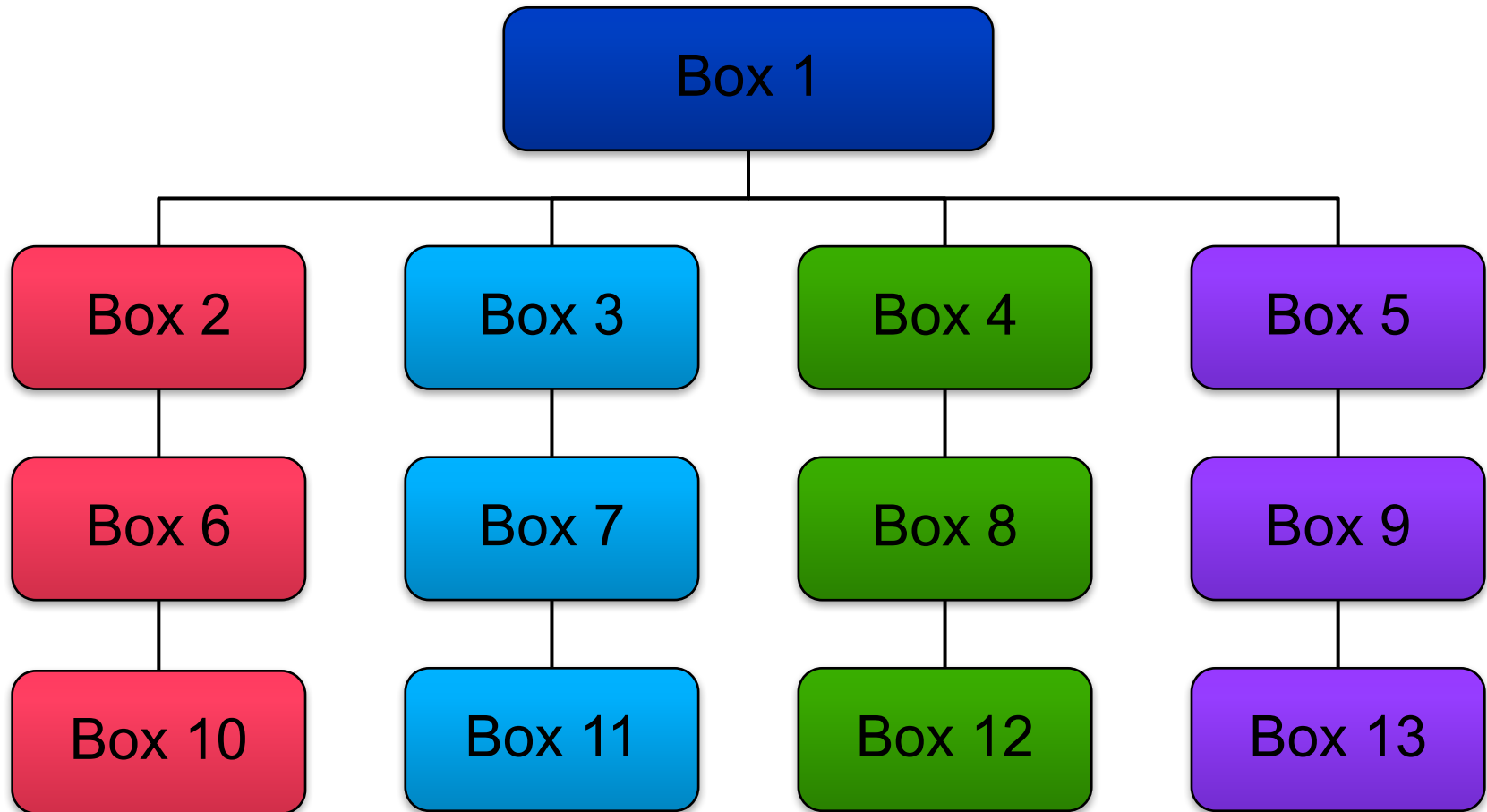
Organization Chart

SmartArt



Organization Chart

Text boxes and Connectors



Mayo Clinic Locations





Questions & Discussion