

# Controversies in Abdominoplasty: What is the Liposuction Limit?

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# Disclosures

Merz – Trainer, Advisory Board

Suneva Medical - Instructor

# Circumferential Liposuction & Abdominoplasty



**Need to do extensive liposuction to get this result**

# Liposuction Volume Considerations

- Patient physiology & comorbidities
- Preoperative hemoglobin and operative EBL
- Trunk liposuction vs extremities
- Bloody vs fatty lipoaspirate
- OR time
- Anesthesia support & fluid management
- Outpatient vs observation/inpatient
- Expected recovery

# Consequences of High Volume Liposuction

- Increased OR time
- Fluid shifts
- Hypothermia
- Urinary catheter
- Hospitalization cost
- Delayed ambulation
- Anesthesiologist stress
- Blood loss, anemia, transfusions, worse.....





# The 5000 mL Lipoaspirate Limit



## Cosmetic Special Topic

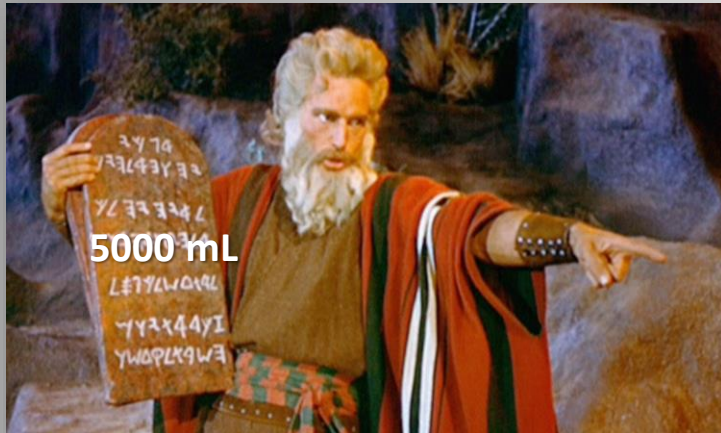
2003

### Practice Advisory on Liposuction

Ronald E. Iverson, M.D., Dennis J. Lynch, M.D., and the ASPS Committee on Patient Safety  
*Pleasanton, Calif.*

skilled surgeons to safely remove larger volumes of fat. Large-volume liposuction is defined as the removal of 5000 cc or greater of total aspirate during a single procedure. A review of the scientific literature shows that there are no scientific data available to support a specific volume maximum at which point liposuction is no longer safe,<sup>21</sup> although the risk of complications is unavoidably higher as the volume of aspirate and the number of anatomic sites treated increase. Body mass index and the

# The 5000 mL Lipoaspirate Limit



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## PATIENT SAFETY

### Outcomes Article

### Evidence-Based Patient Safety Advisory: Liposuction

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Committee

**Summary:** Liposuction is considered to be one of the most frequently performed plastic surgery procedures in the United States, yet despite the popularity of liposuction, there is relatively little scientific evidence available on patient safety issues. This practice advisory provides an overview of various techniques, practices, and management strategies that pertain to individuals undergoing liposuction, and recommendations are offered for each issue to ensure and enhance patient safety. (*Plast. Reconstr. Surg.* 124 (Suppl.): 28S, 2009.)

2009

Large-volume liposuction is defined as the removal of 5000 cc or greater of total aspirate during a single procedure. A review of the scientific literature shows that there are **no scientific data available to support a specific volume maximum at which point liposuction is no longer safe,** especially when performed in the inpatient setting.<sup>12,21,34,76,83,84</sup> However, the risk of complications may be higher as the volume of aspirate and the number of anatomical sites treated increase, and occasional

# State Regulations

STATE	LEGISLATIVE/ REGULATORY SCOPE	SUMMARY	SOURCE	CITATION
<b>ALABAMA</b>	(1) REQUIRES PROVIDER REGISTRATION  (2) INSTITUTES PROCEDURAL LIMITS	Surgeons who perform liposuction with infiltration methods must register with the state medical board and meet state standards for office based procedures using general and regional anesthesia	Alabama Administrative Code - Board of Medical Examiners	<a href="#">Ala. Admin. Code §540-X-101</a>
<b>CALIFORNIA</b>	INSTITUTES PROCEDURAL LIMITS	Liposuction ≥ 5,000cc must be done in accredited facility, licensed hospital or Ambulatory Surgery Center	California Code of Regulations - Medical Board of California	<a href="#">16 CCR § 1356.6</a>
<b>COLORADO</b>	MEDICAL BOARD GUIDELINES - DOES NOT HAVE THE FORCE OF LAW	Liposuction should not exceed the lesser of 4,500cc of supernatant fat or 5% of total body weight.  It should not exceed 1,500cc when combined with any other extensive surgical procedure	Colorado Medical Board Policy Statement on Office Based-Surgery	<a href="#">CMB Policy 40-12</a>
<b>FLORIDA</b>	(1) REQUIRES PROVIDER REGISTRATION	(1) Registration with the Department of Health/Board of Medicine required for liposuction procedures in which more than 1,000 cc of supernatant fat is removed	Florida State Statute	<a href="#">Fla. Stat. §458.309(3)</a>
	(2) INSTITUTES PROCEDURAL LIMITS	(2) Liposuction is limited to 4,000 cc of supernatant fat (1,000 cc when done in combination with another procedure)	Florida Administrative Code - Board of Medicine	<a href="#">FAC §64B8-9.009(2)(b)</a>



# State Regulations

STATE	LEGISLATIVE/ REGULATORY SCOPE	SUMMARY	SOURCE	CITATION
KENTUCKY	MEDICAL BOARD OPINION - DOES NOT HAVE THE FORCE OF LAW	Supernatant fat removal should not exceed 4,000cc	Kentucky Board of Medical Licensure - Board Opinion Relating to Office Based Surgery	<a href="#">§IV(A)3(a)</a>
MASSACHUSETTS	STATE MEDICAL SOCIETY GUIDELINES - DO NOT HAVE THE FORCE OF LAW	States that "many sources consider $\geq 5000\text{ml}$ to be large volume liposuction and therefore recommend considering an inpatient vs. outpatient venue"	Massachusetts Medical Society Office Based Surgery Guidelines	<a href="#">Chapter IV - Patient Admission and Discharge</a>
MISSISSIPPI	(1) GIVES DISCRETION TO SURGEON TO DETERMINE AMOUNT OF SUPERNATANT FAT TO BE REMOVED  (2) STRONGLY RECOMMENDS PROCEDURAL LIMITS	Recommends a maximum range of 4,000-5,000cc in a 70 Kg patient with a BMI under 30. The range should be adjusted downward in thin patients (under 25 BMI) and upward in obese patients (over 30 BMI)	Mississippi Rules and Regulations - State Board of Medical Licensure	<a href="#">Miss. Code. Ann. Title 30, Chapter 15 §§ 303</a>
NEW YORK	REQUIRES FACILITY ACCREDITATION	Offices performing liposuction involving more than 500cc of fat must be fully accredited by a nationally recognized accrediting agency	New York State Statute	<a href="#">N.Y. Pub. Health Law §230-d</a>
OHIO	INSTITUTES PROCEDURAL LIMITS	Liposuction is limited to 4,500ml total aspirate and is not to be performed in combination with other procedures	Ohio Administrative Code - State Medical Board	<a href="#">OAC 4731-25-05(d)</a>
OREGON	INSTITUTES PROCEDURAL LIMITS	Lipoplasty may not exceed removal of more than the lesser of 4,500cc of supernatant fat or 5% of total body weight.	Oregon Administrative Rules - Oregon Medical Board	<a href="#">OAR 847-17-0003(5)(a)</a>

# State Regulations

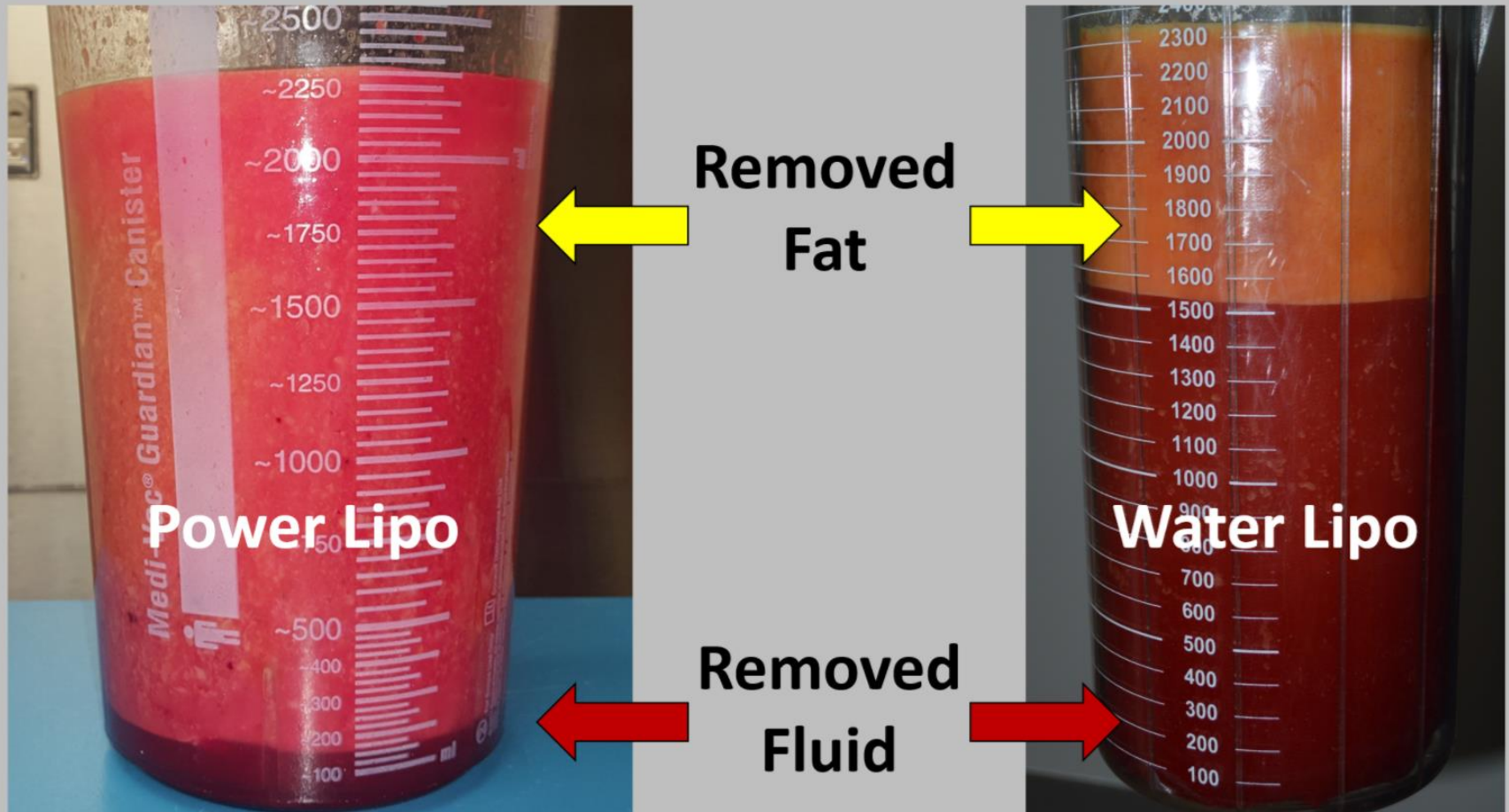
STATE	LEGISLATIVE/ REGULATORY SCOPE	SUMMARY	SOURCE	CITATION
<b>SOUTH CAROLINA</b>	MEDICAL BOARD GUIDANCE - DOES NOT HAVE THE FORCE OF LAW	<b>In Level I office-based</b> surgery facilities, the maximum recommended fat aspirant is <b>3,000cc</b>  <b>In Level II office-based</b> surgery facilities, the maximum recommended fat aspirant is <b>4,000cc</b>	South Carolina Board of Medical Examiners Parameters for Office Based Liposuction Procedures	<a href="http://www.llr.sc.gov/POL/Medical/index.asp?file=Policies/Liposuction.htm">http://www.llr.sc.gov/POL/Medical/index.asp?file=Policies/Liposuction.htm</a>
<b>TENNESSEE</b>	INSTITUTES PROCEDURAL LIMITS	Liposuction is limited to <b>4,000cc of supernatant fat</b> <b>and 2,000cc when combined</b> with other surgical procedures	Tennessee Compiled Rules and Regulations - State Board of Medical Examiners	<a href="#">Tenn. Comp. R. &amp; Regs. 0880-02-.21(7)(d)(8)(a)-(8)(a)(1)</a>

**States may have 4000 to 4500 mL limits  
(1000 to 2000 mL when done with other procedures)**

**Supernatant fat vs total lipoaspirate**

**If you live in these states, whatever I tell you may not apply**

# How Do We Measure Liposuction Volume?



Power-assisted liposuction (PAL) is more efficient and can remove more fat compared to water-assisted liposuction (WAL)

# TOPS Evidence Based Recommendations

## Is There a Safe Lipoaspirate Volume? A Risk Assessment Model of Liposuction Volume as a Function of Body Mass Index

2015

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**Background:** No concrete data exist to support a specific volume at which liposuction becomes unsafe; surgeons rely on their own estimates, professional organization advisories, or institutional or government-imposed restrictions. This study represents the first attempt to quantify the comprehensive risk associated with varying liposuction volumes and its interaction with body mass index.

**Methods:** Suction-assisted lipectomies were identified from the Tracking Operations and Outcomes for Plastic Surgeons database. Multivariate regression models incorporating the interaction between liposuction volume and body mass index were used to assess the influence of liposuction volume on complications and to develop a tool that returns a single adjusted odds ratio for any combination of body mass index and liposuction volume. Recursive partitioning was used to determine whether exceeding a threshold in liposuction volume per body mass index unit significantly increased complications.



# TOPS Evidence Based Recommendations

- 4534 patients
- 69 complications (1.5%)
- Liposuction volumes  $> 100$  mL/BMI independent predictor of complications (OR, 4.6)





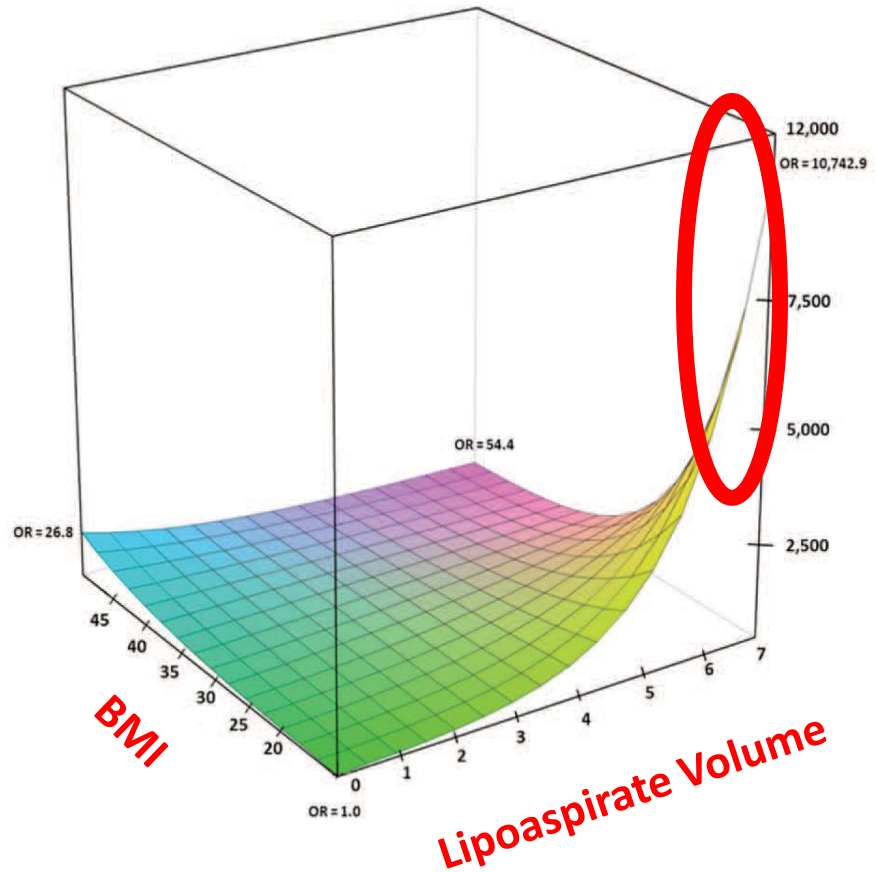
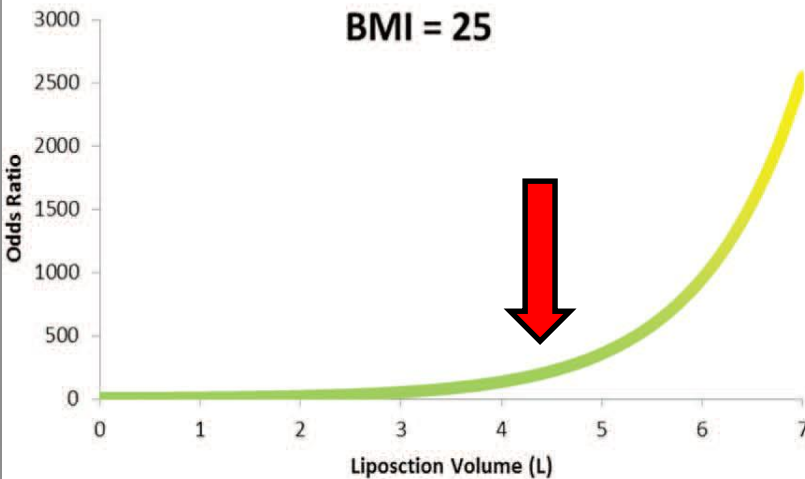
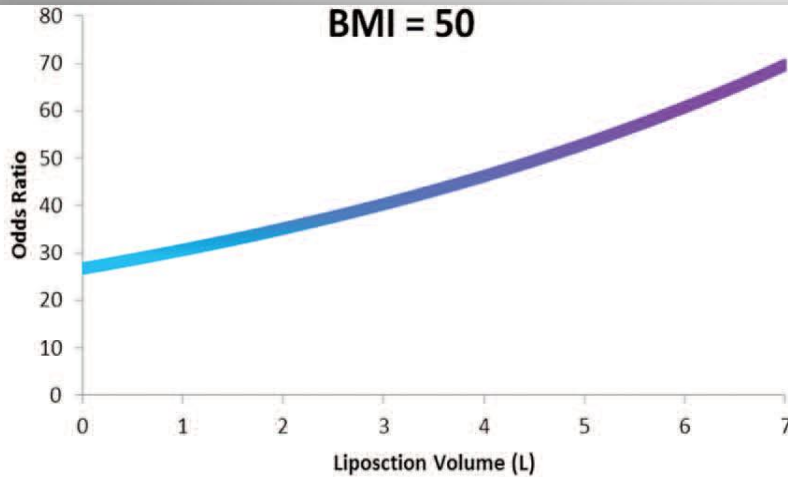
# Complications

Complications	No. (%)
Overall complications*	69 (1.5)
Surgical complications*	60 (1.3)
Seroma requiring drainage	43 (0.9)
Hematoma requiring drainage	5 (0.1)
Operative infection*	10 (0.2)
Superficial SSI	7 (0.2)
Deep SSI	3 (0.1)
Medical complications*	5 (0.1)
Venous thromboembolism*	1 (0.1)
Deep vein thrombosis	1 (0.1)
Pulmonary embolism	0 (0.0)
Cardiac complication	0 (0.0)
Neurologic complication	1 (0.1)
Respiratory complication	1 (0.1)
Renal/genitourinary complication	1 (0.1)
Bleeding complication	1 (0.1)
≤4 units	0 (0.0)
>4 units	1 (0.1)
Any return to the hospital*	11 (0.2)
Unplanned ER visit	6 (0.1)
Unplanned readmission	2 (0.1)
Return to the operating room	5 (0.1)
Death	0 (0.0)

# TOPS Evidence Based Recommendations

Variable	OR	95% CI	<i>p</i>
Overall complications*			
Liposuction volume 250 ml†	1.37	1.14–1.65	0.001†
BMI	1.11	1.01–1.23	0.039†
Interaction effect between liposuction volume and BMI	0.99	0.98–0.99	0.007†
Surgical complications*			
Liposuction volume 250 ml†	1.48	1.21–1.81	<0.001†
BMI	1.15	1.03–1.28	0.012†
Interaction effect between liposuction volume and BMI	0.99	0.98–0.99	0.002†
Medical complications*			
Liposuction volume 250 ml†	1.07	0.49–2.07	0.984
BMI	1.09	0.98–1.21	0.103
Interaction effect between liposuction volume and BMI	0.99	0.98–1.02	0.999
Seroma			
Liposuction volume 250 ml†	1.53	1.23–1.91	<0.001†
BMI	1.14	1.01–1.29	0.040†
Interaction effect between liposuction volume and BMI	0.98	0.98–0.99	0.002†
Hematoma			
Liposuction volume 250 ml†	0.98	0.12–7.68	0.981
BMI	0.70	0.25–1.97	0.496
Interaction effect between liposuction volume and BMI	1.00	0.91–1.10	0.977
Operative infection*			
Liposuction volume 250 ml†	1.26	0.70–2.27	0.447
BMI	1.10	0.79–1.54	0.557
Interaction effect between liposuction volume and BMI	0.99	0.97–1.01	0.529
Return to hospital*			
Liposuction volume 250 ml†	1.08	0.57–2.07	0.814
BMI	1.08	0.79–1.47	0.652
Interaction effect between liposuction volume and BMI	1.00	0.97–1.02	0.776

# TOPS Evidence Based Recommendations



# TOPS Data: Liposuction + Abdominoplasty

## Is There a Limit? A Risk Assessment Model of Liposuction and Lipoaspirate Volume on Complications in Abdominoplasty

2018

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**Background:** Combining liposuction and abdominoplasty is controversial because of concerns for increased complications and potential for vascular compromise of the abdominoplasty flap. Also, the lipoaspirate volume in abdominoplasty is regulated in some areas to as little as 500 ml when performed with abdominoplasty. This study measures abdominoplasty complication rates when performed with and without trunk liposuction, and evaluates the effect

- 11,191 patients
- 9638 (86%) abdominoplasty + truncal lipo      11% Complications
- 1553 (14%) abdominoplasty alone      13% Complications
- Abdominoplasty + liposuction had LESS complications & seromas
- Questions current state laws on liposuction limits

# Study Limitations

- Included only trunk liposuction
- Lipoaspirate volume ranged 20 to 8800 mL
  - Totals may have included non-trunk areas
- Of 1612 cases with known lipoaspirate volume
  - 3% between 4001 and 5000 mL
  - 3% greater than 5000 mL



# Large Volume Liposuction Clinical Pathway

## **Radha Sukhani MD Anesthesiologist**

- GETA: inhalation agent, continuous Propofol (50mcg/kg/min) + Ketamine (25-30 mg max)  
Higher doses of ketamine significantly delay recovery
- Limit narcotics to fentanyl 100 mcg total
- Lidocaine in tumescence provides analgesia
- Antiemetics: Benadryl 25mg + Decadron 6-8mg post induction + 4 mg of ondansetron 30 mins before emergence
- Active warming measures

# Large Volume Liposuction Clinical Pathway

## Fluid management

- Bladder catheter + Fluid warmer + 18G IV

**Fluid Input** = Total IVF + total tumescent fluid

- IVF crystalloid loading: 2000 mL before start then 1000 mL/hr
- Hetastarch: 15 mL/Kg, max 1000 mL

**Fluid Input** = Aspirate volume (4000 – 6000ml) + urine output

## Lipoaspirate Volume

- **Obese (>30 BMI)** tend to have less vascular fat so less blood loss
- **Non-Obese (<30 BMI)** tend to have more vascular fat so more blood loss
  - Limit total lipoaspirate to 70-75 ml/kg

## Monitor for OVER HYDRATION

- Bounding pulse
- Hypertension
- Pulmonary edema (coughing, SOB, crackles at lung bases)

# Abdominoplasty + Liposuction Recommendations

- We don't know what the limit is (100 ml/BMI?)
- Patient selection overrides strict volume limits
- Consider preoperative hemoglobin & EBL
- Reassess plan if bloody lipoaspirate
- Consider OR time
- Experienced anesthesiologist
- Admit for observation if any concerns
- Stage procedures
- Common sense & safety first

# Controversies in Abdominoplasty: What is the Liposuction Limit?

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