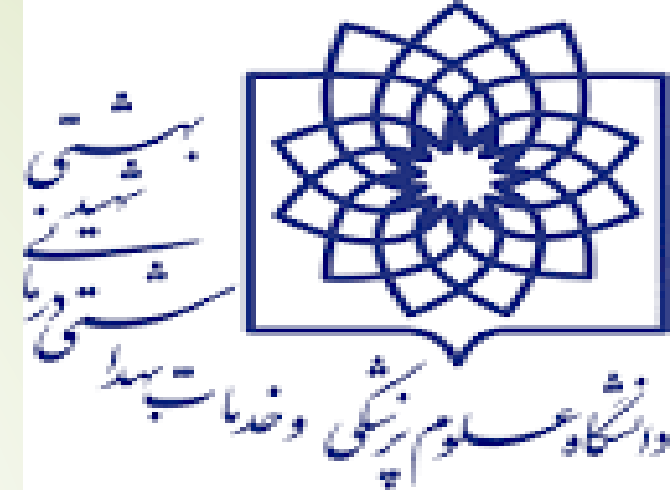


مدیریت نظارت و اعتبار بخشی معاونت درمان
واحد وقایع ناخواسته درمانی




مدیریت و ملاحظات جراحی و بیهوشی ایمن در لیبوساکن

دکتر مهدی احمدی
فوق تخصص جراحی پلاستیک و ترمیمی

دکتر بهزاد بهزادی
متخصص بیهوشی و مراقبت های ویژه

Case Report





بیمار خانم 43 ساله با سابقه دیابت و فشار خون تحت درمان با انسولین تزریقی، متفورمین، استاتین و لوزارتان کاندید عمل جراحی لیپوآبدومینوپلاستی بوده است

Weight: 71kg

Height: 160 cm

BMI: 27.73

Hematology (1)

Test	Result	Unit	Reference Rang	Differential
CBC	-			
W.B.C.	7.5	x10 ³ /ul	4-10	Neutrophil 62
R.B.C.	5.28	x10 ³ /ul	3.9-5.8	Lymphocyte 27
Hb	15.2	gr/dl	12-17	Mono 6
H.C.T	45.9	%	36-53	Eosinophil 5
M.C.V	87	fl	80-95	-----
M.C.H	29	pg	27 - 32	Total : 100%
M.C.H.C	33	gr/dl	32 - 36	
RDW	12.7	%	11 - 15	
Platelet	268	x10 ³ /ul	150 - 450	

Hematology(2)

Test	Flag	Result	Unit	Reference Range
ESR 1hrs		5	mm	0-20

Biochemistry

Test	Flag	Result	Unit	Reference Range
Fasting blood sugar		237*	mg/dl	Child : 60-100 Adult : 70-110 Pregnant : 65-105
Urea		29	mg/dl	15-45
Creatinine		0.7	mg/dl	0.50 - 1.40

Blood Group

Test	Result	Unit
Blood group Rh	((O))	
Rh	Positive	

Hormone Analysis

Test	Flag	Result	Unit	Reference Range
Hb-A1C		6.9	%	Normal : < 5.7 Pre-diabetics : 5.7 - 6.4 Diabetics : > = 6.5 Good Control : <7.0 Poor Control : >8.0 Borderline : 7.0-8.0

*: Rechecked

Hormone Analysis

Test	Flag	Result	Unit	Reference Range
HIV I & II (Pishtazteb- EIA)		0.1	-	Positive : >=1.0 Negative : <1.0
HCV-Ab (Pishtazteb- EIA)		0.2	-	Positive : >=1.0 Negative : <1.0

Hormone3

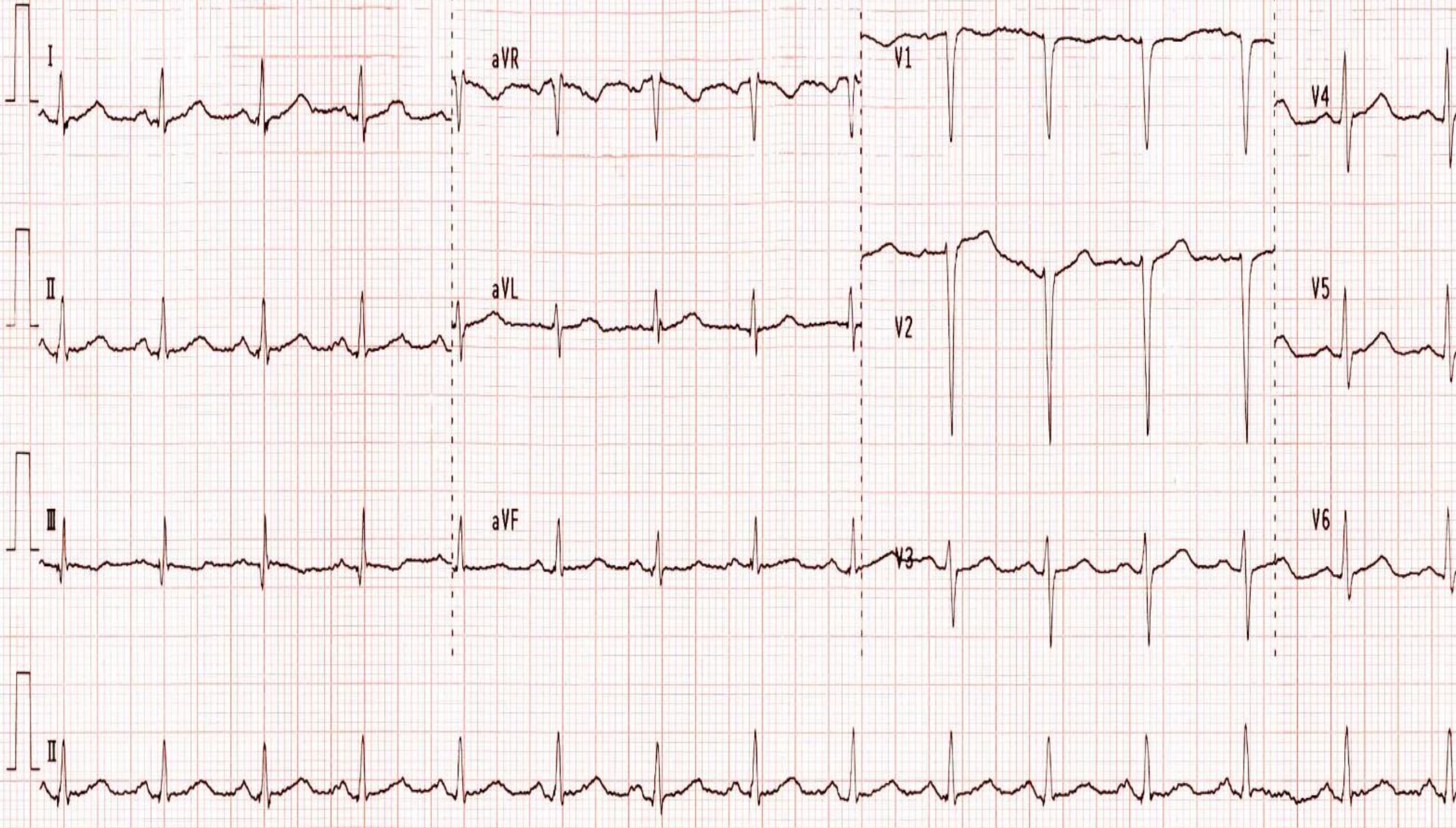
Test	Flag	Result	Unit	Reference Range
T4(ELFA)		7.38	micg/dl	5.1-14.1
T3		1.4	ng/ml	0.52-1.85
T.S.H		1.3	micIU/ml	0.39-6.16

Serology

Test	Flag	Result	Unit	Reference Range
CRP Quantitative	H	6.8	mg/l	up to 6

Coagulative Test

Test	Flag	Result	Unit	Reference Range
PT patient		13.5*	Sec	12.5-13.5
PT Control		12.5		
INR		1.1	-	1-1.1
PTT		26	Sec	24-36



0s

LVEDD/V	52mm	mm/cc
LVESD/V	34mm	mm/cc
IVS	8	mm
PW	8	mm
LVEF%	55	%
LA diameter	36	mm
Aortic root	28	mm
AV annulus		mm
STJunction		mm
Ascending Aorta	33	mm
LA area/Volume		Cm2/cc
RA area/ Volume		Cm2/cc
RVD	27	mm
IVC size	16	Cm/s

MVE	49	Cm/s
MVA	68	Cm/s
MV DT		ms
MV VP		m/s
MV PHT		m/s
MV PG/MG	4/2	mmHg
MV area		cm ²
AV PG/MG	6/3	mmhg
AV/LVOT VTI		cm
AV V max		m/s
AV AT		ms
PV PG/MG	4/2	mmhg
PV/RVOT VTI		cm
PV AT		ms

TV PG/MG		mmHg
TRG	21	mmHg
SPAP	25	mmHg
mean PAP		cm ² /cc
MR ERO/MRRV		cm ² /cc
AI ERO/AI RV		cm ² /cc
RVSM	11	cm/s
TAPS E		mm
Lateral e'	13	cm/s
Septal e'	10	cm/s
E/e'	5	cm/s
S'		cm/s
A'		cm/s
QP/QS		-----

Conclusion:

- Normal LV size and normal systolic function, LVEF=55%/no LVH/no mass or clot.
- No RWMA at rest.
- Normal RV size and normal function /no RVH/normal RVOT&MPA size.
- Normal LA size & normal RA size///normal LA pressure.
- Normal MVLs, no MS, mild MR.
- Normal tricuspid AV, no AS, no AI.
- Normal PVLs, no PS, mild PI.
- Normal TVLs, no TS, mild TR/sPAP about 25 mmhg.
- Normal size of IVC with good respiratory collapse.
- IAS:intact.
- Aorta: normal.
- No PE.

① 1000

② 1000

③ 1000

④ 1000

⑤ 1000

① 1000

② 1000

③ 1000

④ 1000

⑤ 1000



① 1000

② 1000

عمل جراحی تحت بیهوشی عمومی با تعبیه لوله اندوتراکئال



ایست قلبی درحین ساکشن ناحیه پشت درپوزیشن پرون



چرخاندن بیمار و شروع عملیات احیا



مشاوره های قلب و جراحی عروق و انجام سونوگرافی bedside



تشخیص پارگی عروق بزرگ و لاپاراتومی



تزریق فراورده های خونی



ادامه عملیات احیا



فوت بیمار

خانم 21 ساله بدون سابقه بیماری خاص و مشکل زمینه ای (ASA 1) کاندید عمل جراحی لیپو ابدیمینوپلاستی

بیمار تحت بیهوشی عمومی قرار میگیرد

پوزیشن پرون

درحین تزریق مایع تامیسنیت بیمار دچار برادیکاردی و ایست قلبی

انتقال به وضعیت سوپاین

شروع عملیات احیا

پس از بازگشت ریتم قلبی دچار vtach میشود با الکتروشوک درمان میشود

مشاوره های قلب و نورولوژی انجام میشود

با توجه به تشنجهای مداوم بیمار درمان با تیوپنتال و میدازولام آغاز میگردد



انتقال به ICU



فوت بیمار 3 روز پس از بستری در ICU به دلیل عوارض قلبی

LV	Normal LVEDD LVESD FS EF% 25%	Motion abnormality: Hypokinesia Severe Akinesia Diskinesia G-HK	IVSDD IVSSD LVPWD LVPWS No WH
MV	Normal EPSS EF Slope Thickend	Doming Concomitant motion Calcification Vegetation	SAM MVA Flail MV Prolapse Thickening mild MR
AO	Normal Root dimension Cusp separation	Cusp number Calcification Vegetation	l
TV	Normal Thickend	Doming Vegetation	Prolapse Flail mild to No
PV	Normal Thickend	Doming Vegetation	Depth of a wave TR
RV	Normal	RVEDD	RVH VSD TRG: -
Abnormal structure		ASD Other :	others: others: Normal AV
LA	Normal	LA dimension	Mild
RA	Normal	RA dimension	Moderate Size -
Pericardium	Normal Thickend Calcification	pericardial fluid:	Large TAPS: 1.8

Doppler study

MV	Normal flow Peak velocity	peak gradient MVA	MR PHT
AO	Normal flow Peak velocity	gradient AI	PHT for AI
TV	Normal flow Peak velocity	gradient TR	Gradient RV/RA
PV	Normal flow Peak velocity	PI Acceleration MSC	QP

دکتر فرهاد شایگان
 تخصصی قلب و عروق
 نظام پزشکی
 ۱۵۰۲۹۴


Conclusion: Normal LV size Severe - LVSD EF 25%
 Normal RV No sig VHD NOPE

Name and signature: _____

هر و امضاء پزشك: _____

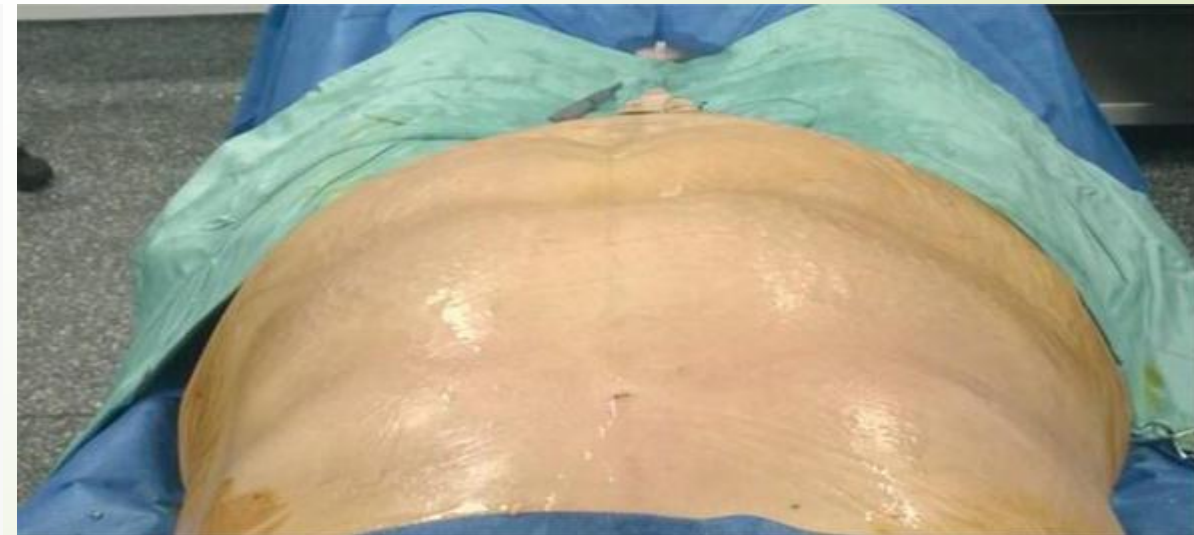
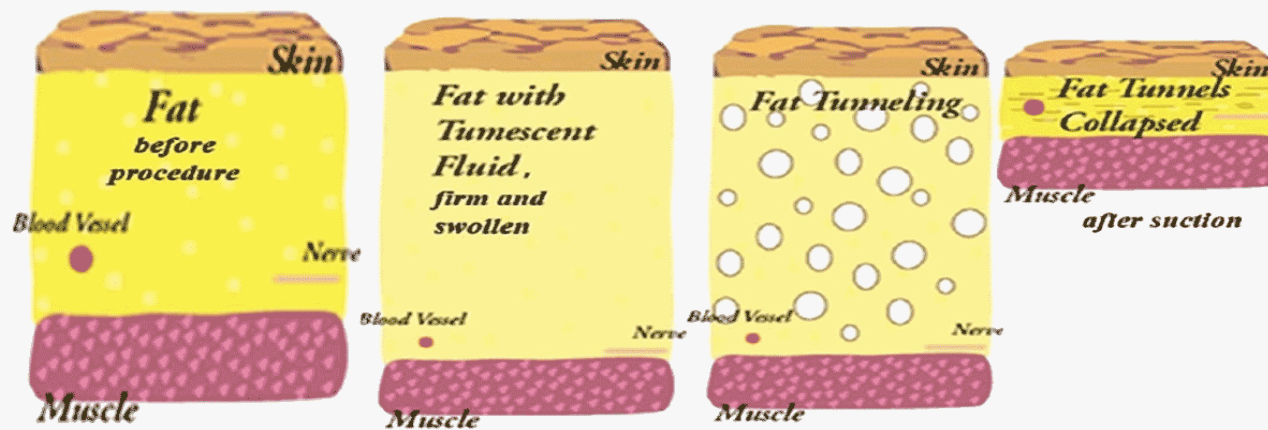


स्वास्थ्य विभाग
एम्बुलेंस
गोपालपुर
दिनांक 18/11/2020

- 
- ❖ Many events that occur during this procedure
 - ❖ Improve the body contour
 - ❖ beginnings in 1921, with the Parisian surgeon Charles Dujarrier
 - ❖ In 1970s, the technique evolved with various doctors such as Shrudde, Kesserling and Meyer, the Fischers
 - ❖ The technique was again modified in 1977 by the French surgeon, Yves Gerard Illouz, who added hyaluronidase and saline solution to try to emulsify the fat and facilitate its aspiration
 - ❖ American dermatologist, Klein, described the tumescent technique

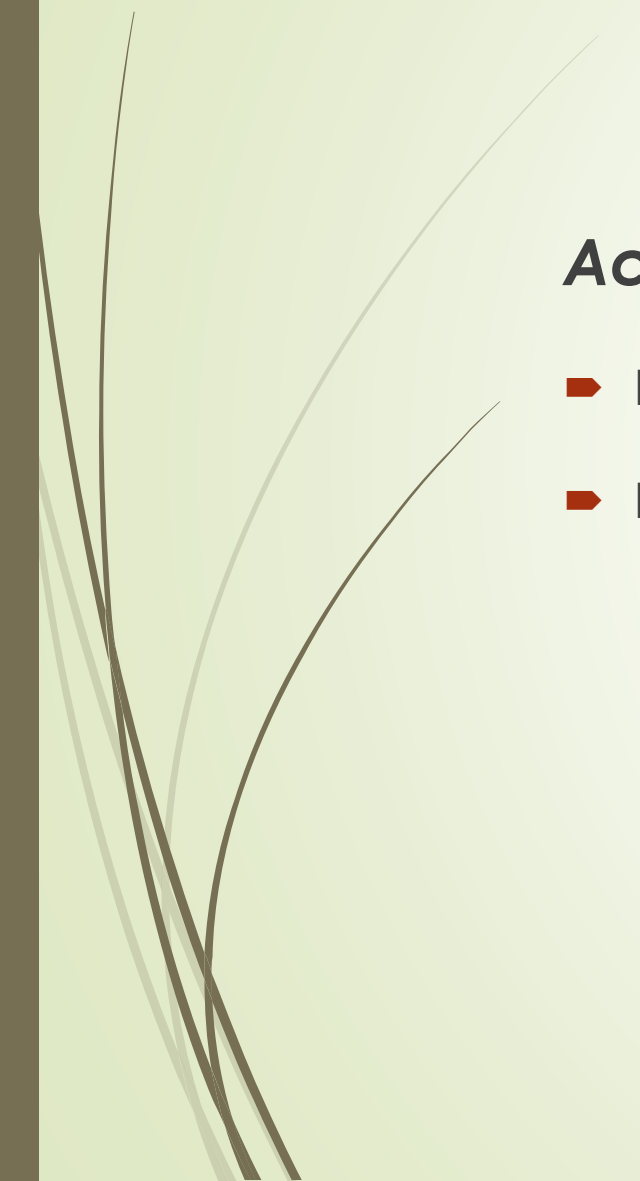
Types of Liposuction

- Dry technique
- Wet technique
- Super wet technique
- Tumescent method





According to the aspirated volume:

- ▶ large volume : > 4 liters aspirated
 - ▶ low volume : < 4 liters aspirated
- 

According to the surgical instruments:

- power-assisted
- laser-assisted
- ultrasonic-assisted
- Manual liposuction



Tumescent solutions

Klein's solution

1000 ml Normal saline

50 ml, 1% lignocaine

1 ml, 1:1,000 epinephrine

12.5 ml, 8.4% sodium bicarbonate

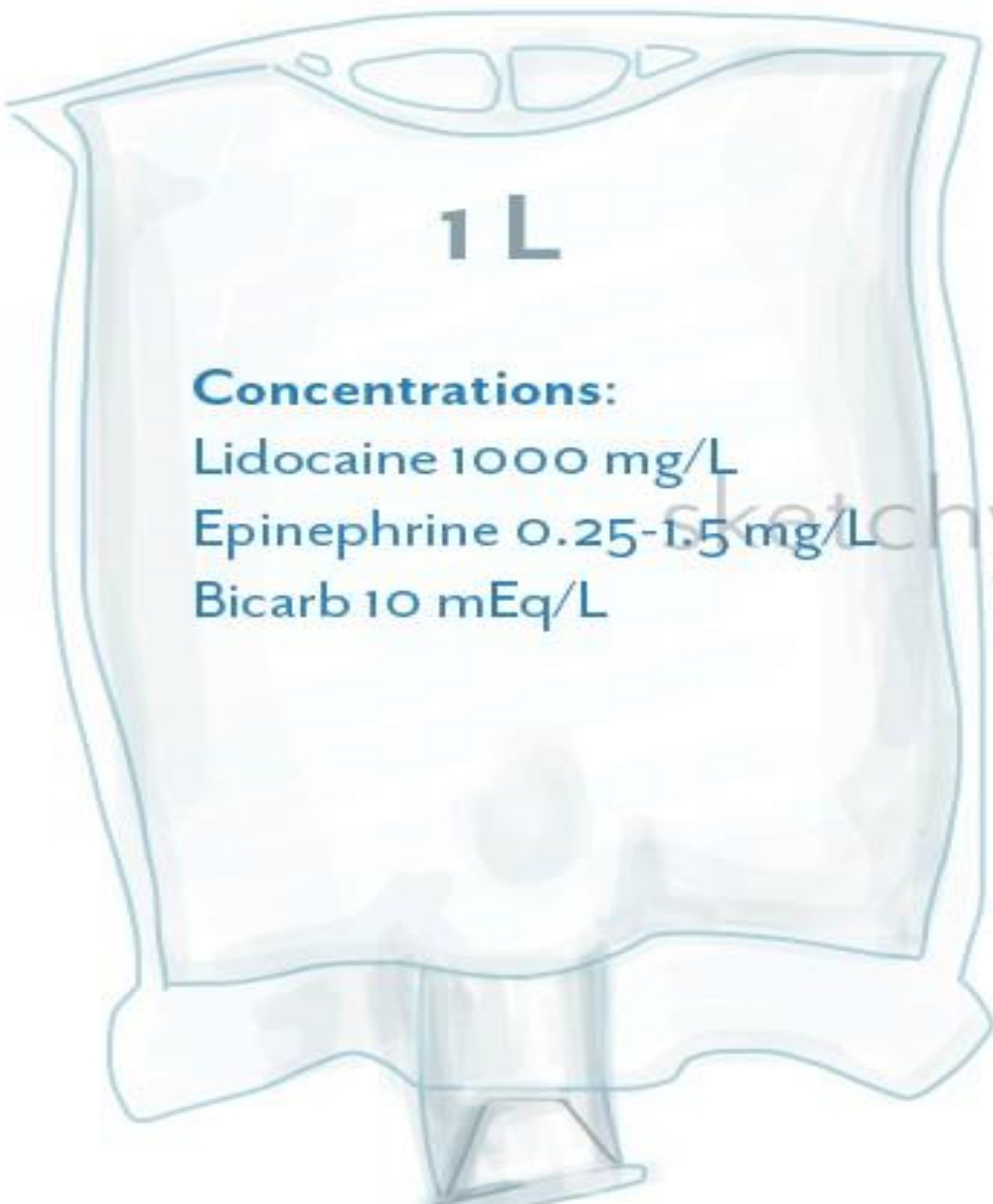
Hunstadt's solution

1000 ml Ringer's lactate

50 ml, 1% lignocaine

1 ml, 1:1,000 epinephrine

Tumescent (*Klein's Solution*)



1 L

Concentrations:

Lidocaine 1000 mg/L

Epinephrine 0.25-1.5 mg/L

Bicarb 10 mEq/L

Recipe:

1 L of normal saline (0.9% NaCl)

100 ml 1% lidocaine (10 mg/ml) = 1000 mg

1 ml (1 ampule) of 1:1,000 epinephrine (1 mg/ml) = 1 mg

10 ml of 8.4% sodium bicarbonate = 10 mEq

Final amounts in the bag (in mg):

1000 mg lidocaine



1 mg epinephrine (1 : 1,000,000)



10 mEq bicarb

Toxic Dose of Tumescent:

35 mg/kg (much more than the 7 mg/kg of local anesthetic)

So for a 70 kg person = 2,450 mg

- 
- 
- ❑ The most used local anesthetic is lidocaine
 - ❑ The maximum limit is 7 mg/kg
 - ❑ The safety range in liposuction is 35–55 mg/kg
 - ❑ The peak levels of lidocaine and its active metabolite
 - ❑ (monoethylglycinexylidide) occur in a period as variable as 8–32 h
 - ❑ Lidocaine is eliminated from the body by diethylation in the liver by isoenzyme groups 1A2 and 3A4 of cytochrome p450

- 
- 
- ❑ Vasoconstrictors are used to reduce blood circulation in the tissues, which helps to slow the absorption of local anesthetics
 - ❑ Adrenaline is the most commonly used vasoconstrictor
 - ❑ Theoretically allows blood loss to be 1–2% of the total volume aspirated
 - ❑ the recommended concentration for the tumescent solution ranges from 0.25 to 1 mg/Lt





Preoperative Evaluation

- ❑ The obese patient is **programed** for this type of procedure
- ❑ **Usually other associated comorbidities:**
 - *High blood pressure*
 - *Diabetes mellitus*
 - *Ischemic heart disease*
 - *DVT*
 - *Obstructive sleep apnea*
- ❑ **These conditions should be well controlled**

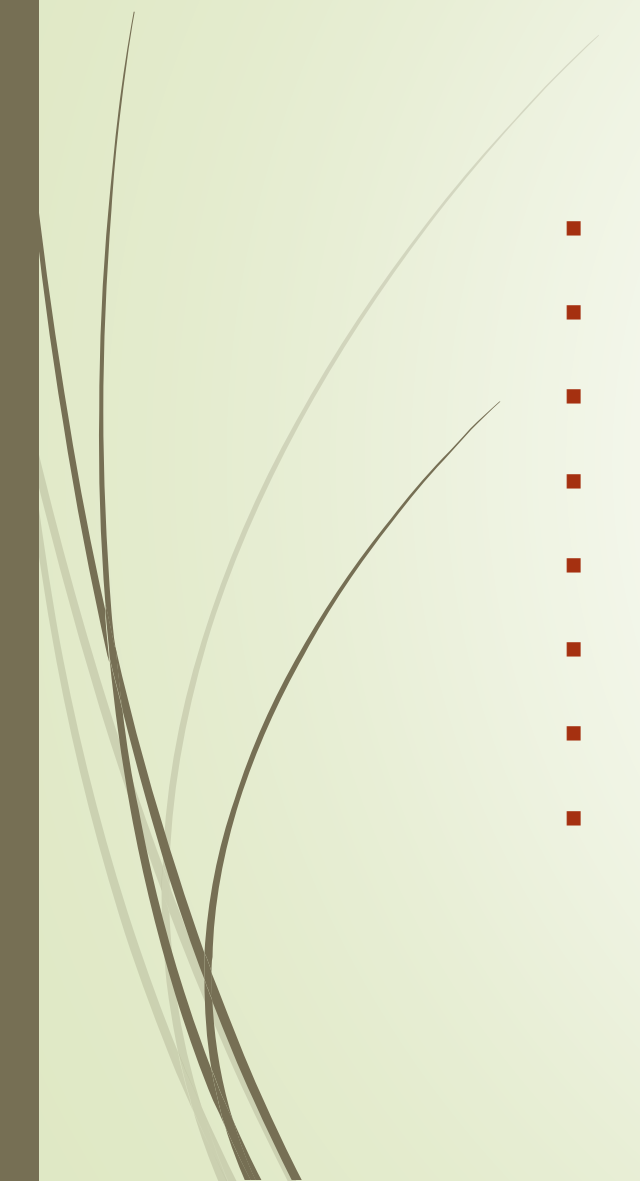


➤ ***The drugs taken by the patient should be checked exactly:***

- Amphetamines
- Thyroid hormones
- Ephedrine
- Fairly large list of herbs and teas



Laboratory Tests

- CBC
 - Blood chemistry
 - Glycosylated hemoglobin
 - Thyroid profile
 - Coagulation times
 - Liver function tests
 - Pregnancy detection
 - Hepatitis B, and C, antibodies against HIV
- 

Anesthesia Management

➤ ANESTHESIA TECHNIQUE :

➤ **MAC + Sedation**

➤ **Lumbar Epidural Anesthesia**

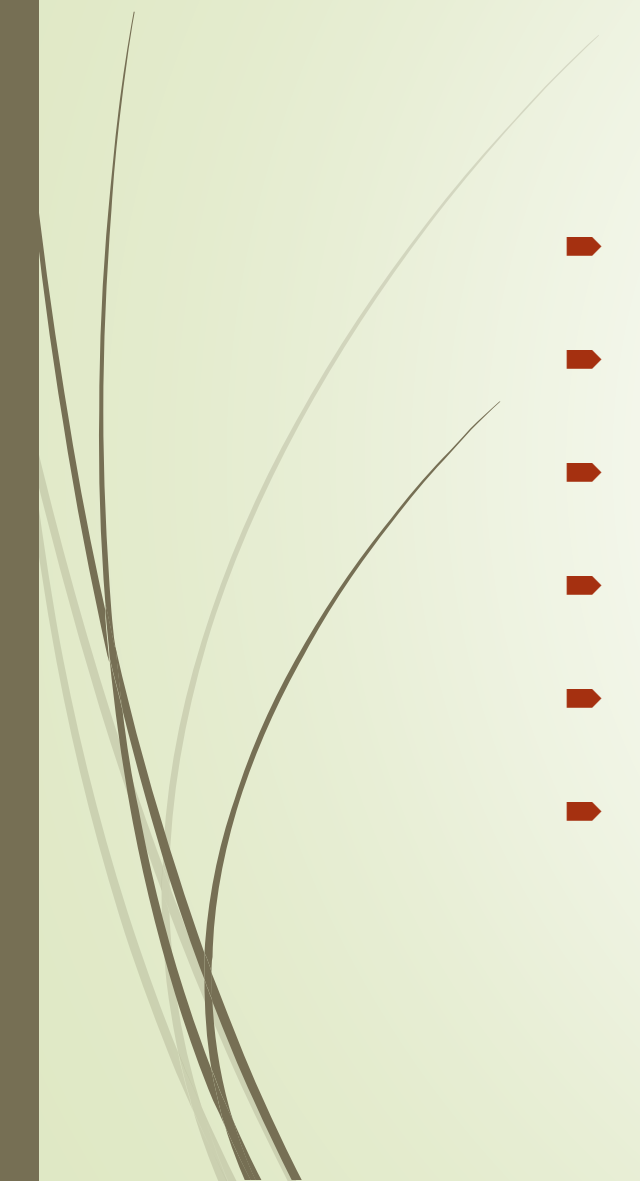
➤ **Subarachnoid Anesthesia**

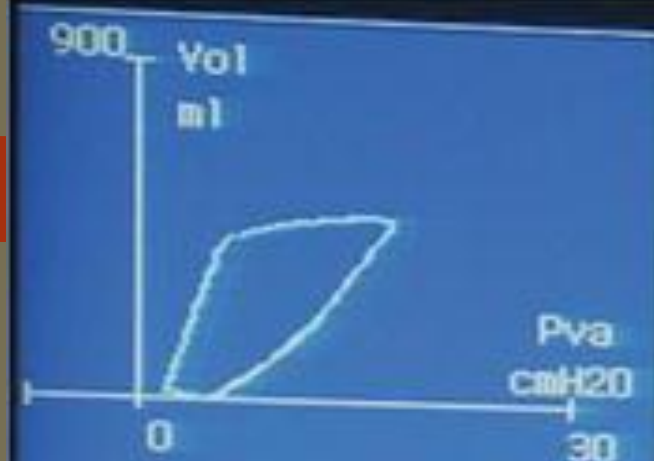
➤ **General Anesthesia:**

- *Strongly recommend the use of general anesthesia*
- *Intubation*
- *Position*
- *Taking care of pressure points on the nose and eyes*
- *Intermittent pneumatic compression*



Monitoring

- ▶ *Oxygen saturation (SpO₂)*
 - ▶ *Noninvasive blood pressure (NIBP)*
 - ▶ *End-tidal carbon dioxide (EtCO₂)*
 - ▶ *Electrocardiogram (ECG)*
 - ▶ *Temperature monitoring*
 - ▶ *Monitoring hourly urine output*
- 



Avance cmH2O ml

Ppico **19** VTInsp **500**

Pplat **—** VTesp **480**

Pmed **6** l/min

PEEPtot **2** VMInsp **5.0**

VMasp **4.8**

I:E **— : —**

Compl **—** ml/cmH2O

Pva **—** cmH2O/l/s



Plet **61**/min Análisis arit. severa

ST II **0.4** II **0.4**

SPO2 **100**

Apnea desactivada

CO2 Et **34** FI **0**

FR **10**/min

Des Et **8.1** FI **8.7**

CAM **1.4**

RE **21**

SE **21** BSR **0%**

PANI

mmHg Sis Dia

149/91

Media (111) 0 5 min

T1+T2	
°C	38
T1	— T2-T1
T2	—

TINY	
Cable desconectado	
TOF%	—
Cuent	—

Gases			
%	O2 78	N2O 0	Des 8.1
Et	78	0	8.1
FI	83	0	8.7



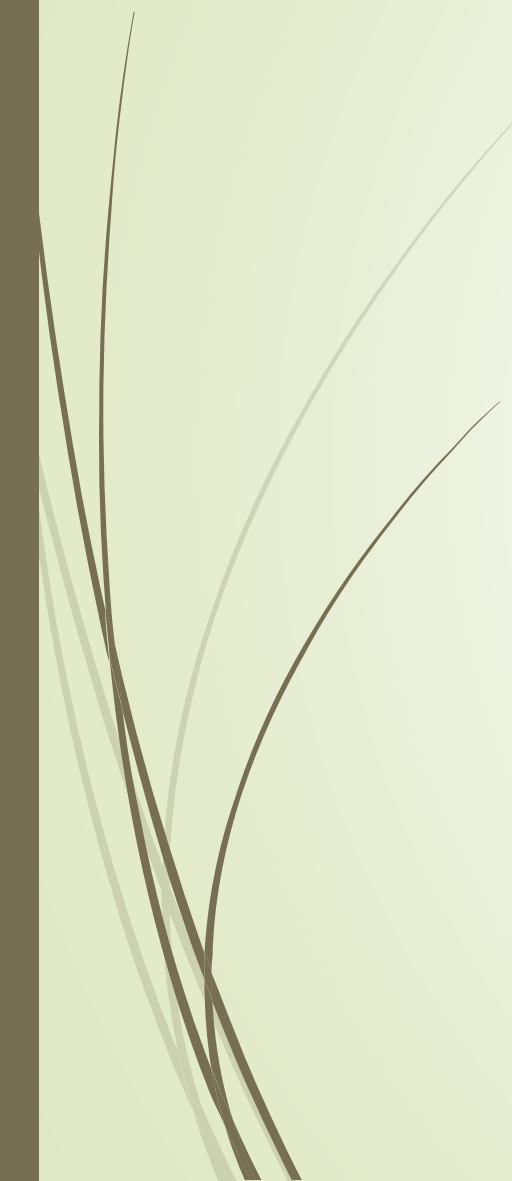
Management of perioperative intravenous fluids

- ▶ The total fluids received: include intravenous fluids and the volume of wetting solution injected
- ▶ The output includes: urine output and the aspirated fluid which includes fat, blood, and a portion of wetting solution
- ▶ The difference between the fluid input and output is the residual volume

Intraoperative fluid volume ratio:1

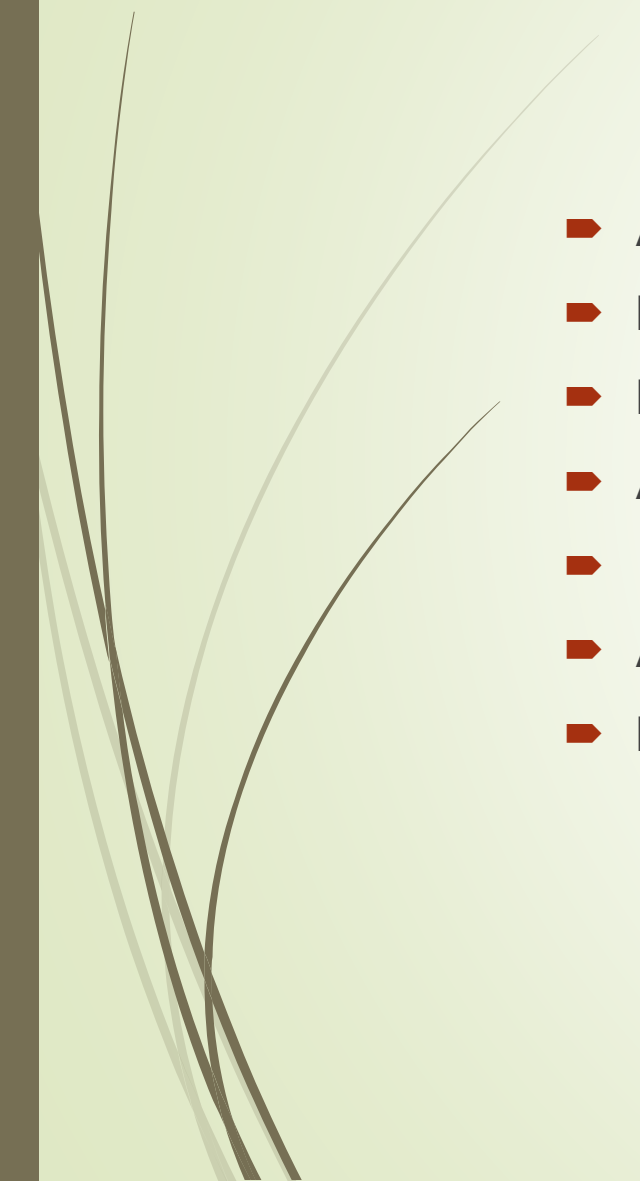


Risks

- I. Liposuction >5 liters**
 - II. Tumescant solution >5 liters**
 - III. Liposuction of large volumes with a second procedure**
 - IV. Multiple procedures including abdominoplasty**
 - V. Anticipated blood loss >500 mL in adults**
 - VI. Duration of surgery >6 h**
- 



Complications following liposuction

- **Anemia**
 - **Hypothermia**
 - **Fat embolism**
 - **Acid-Base Imbalance**
 - **Surgery related complication**
 - **Anesthesia related complications**
 - **Deep Vein Thrombosis**
 - **Pulmonary edema**
 - **Lignocaine toxicity**
 - **Sepsis including necrotizing fasciitis**
 - **ARDS**
- 



Deep vein thrombosis and embolism

- ❑ Combined procedures increase 6.6 times
- ❑ Surgical position
- ❑ Abdominal compression
- ❑ Bandages and garments

Low risk patient:

- *Comfortable position*
- *Intermittent pneumatic compression*
- *Elastic compression stockings*




High risk patient:

- *Patients with a history of previous episode of DVT*
- *Patients undergoing procedures lasting more than 5 h*
- *Patients with liposuction of large volumes (>5 liters)*
- *Patients who undergo combined procedures that include abdominoplasty*
- *Patients traveling in the immediate preoperative*
- *The patients who undergo gluteal lipoinjections*

low-molecular-weight heparin every 12 h until ambulation



Hypothermia

- Exposure of large body surface areas*
 - Infusion of large volumes of cold wetting solutions*
 - Long duration of procedure*
 - General anesthesia*
 - Heat loss during mechanical ventilation*
 - Ambient room temperature*
 - Intravenous fluids*
- 



Measures to prevent hypothermia

- ▶ *Warm betadine preparation fluid*
- ▶ *Warm intravenous and wetting fluid*
- ▶ *Exposed body areas to be kept covered*
- ▶ *Use forced warm air*
- ▶ *Maintain operating room temperature (24°C)*



***Easily preventable by simple measurements
and safety protocols***



POSTOPERATIVE CARE

- ❑ *Pain relief*

- ❑ *Early ambulation*

- ❑ *Complications:*

 - cardiac arrest:**

 - *Fluid overload*
 - *Pulmonary edema*
 - *Lignocaine toxicity*
 - *Fat embolism*
 - *Thromboembolism*

