CARDIOPULMONARY RESUSCITATION- FROM THE PAST INTO THE FUTURE.

Yanina Purim-Shem-Tov, MD, MS, FACEP
Associate Professor
Rush University Medical Center

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IT'S HOW MEDICINE SHOULD BE

Disclosure

No conflict of interest to disclose

Pre-test

1. **The following medication category decreases myocardial oxygen demand**
   a. Beta-adrenergic blocking (beta-blockers) agents
   b. Beta-adrenergic agonist agents
   c. Vasopressin
   d. Alpha-adrenergic agonist agents

Pre-test

2. **In adult patients, mouth-to-mouth resuscitation by untrained provider is absolutely imperative during CPR to improve patients' survival**
   a. True
   b. False

Pre-test

3. There is ample evidence that beta-blockers alone could be used in VF/VT arrest
   a. True
   b. False

Pre-test

4. DSD does not work in refractory VF arrest, and should not be used, ever.

a. True

b. False

Pre-test

5. Left Stellate Ganglion block could be used to control electric storm.

a. True

b. False

Objectives

- Review
  - Resuscitation History
  - Current Resuscitative Guidelines
- Discuss therapies that will likely improve patient's survival

HISTORY

HISTORY

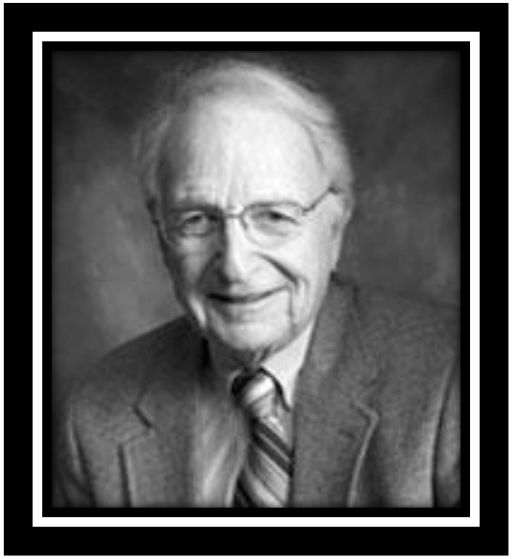
- 5000-3000 BC- first mouth to mouth ventilation
- 1740- Paris Academy of Science
  - Use for drowning victims
- 1780- first attempt of Newborn resuscitation by blowing
- 1874- first experimental direct cardiac massage
- 1901- first successful direct cardiac massage in man
- 1946- first experimental indirect cardiac massage

HISTORY

- 1957: U.S. military use
  - Revive unresponsive victims
- 1960: CPR developed
  - American Heart Association CPR committee

HISTORY

- **1972: Leonard Cobb**
  - First mass citizen training in CPR
  - Trained over 100,000 people in 2 years



HISTORY

- **1980's**
  - **1981** A program to provide telephone instructions in CPR began in King County, Washington.
  - **1983** AHA convened a national conference on pediatric resuscitation to develop CPR and ECC Guidelines for pediatric and neonatal patients.
  - **1985** Fourth National Conference on CPR and ECC.
  - **1988** AHA introduces first pediatric courses, pediatric BLS, pediatric ALS and neonatal resuscitation, cosponsored with The American Academy of Pediatrics (AAP).

HISTORY

- **1990's**
  - Early Public Access Defibrillation (PAD) programs are developed with the goal in mind to provide training and resources to the public so they are able to aid in the successful resuscitation of cardiac arrest victims.
  - **1992** Fifth National Conference on CPR and ECC.
  - **1992** International Committee on Resuscitation (ILCOR) founded
  - **1999** First task force on first aid was appointed. First International Conference on Guidelines for CPR and ECC

HISTORY

- **2004** AHA and ILCOR releases a statement regarding the use of AEDs on children
- **2005** AHA developed the Family & Friends® CPR Anytime® kit
- **2005** The 2005 International Consensus on ECC and CPR Science with Treatment Recommendations (CoSTR)

HISTORY

- **2008** The AHA releases a statement about Hands-Only™ CPR
- **2010** The 2010 International Consensus on ECC and CPR
- **2015** The Institute of Medicine releases its report titled Strategies to Improve Cardiac Arrest Survival: A Time to Act (2015)

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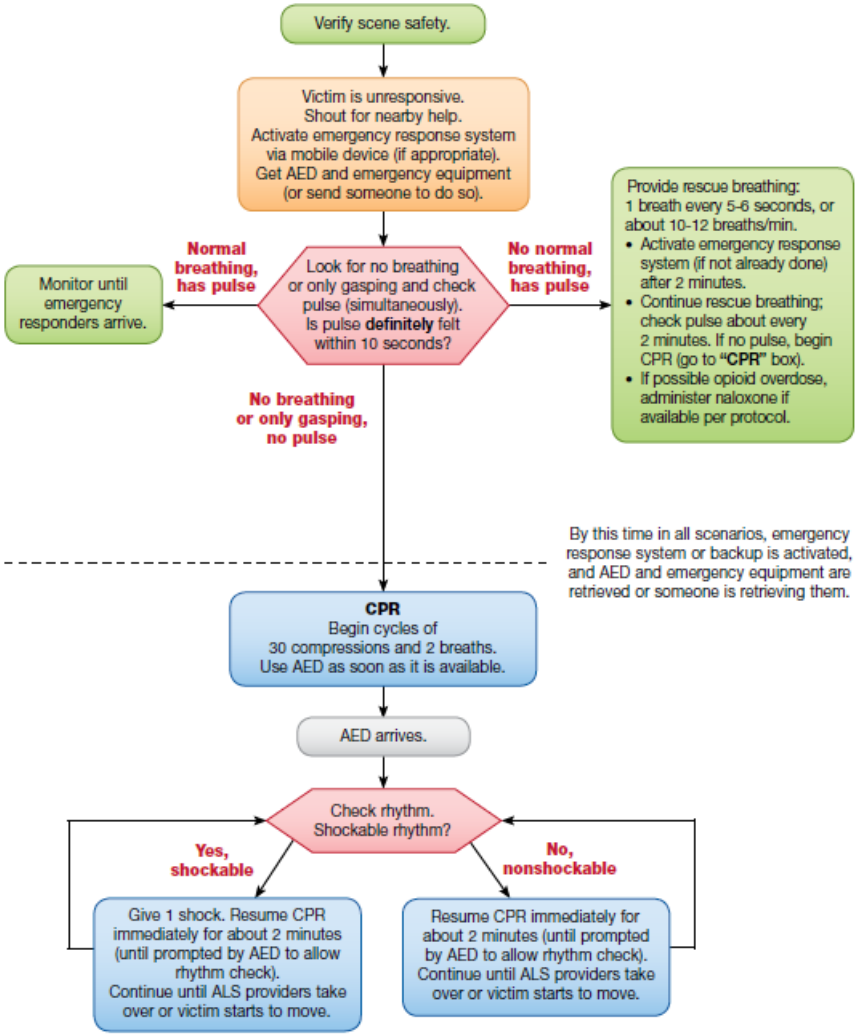
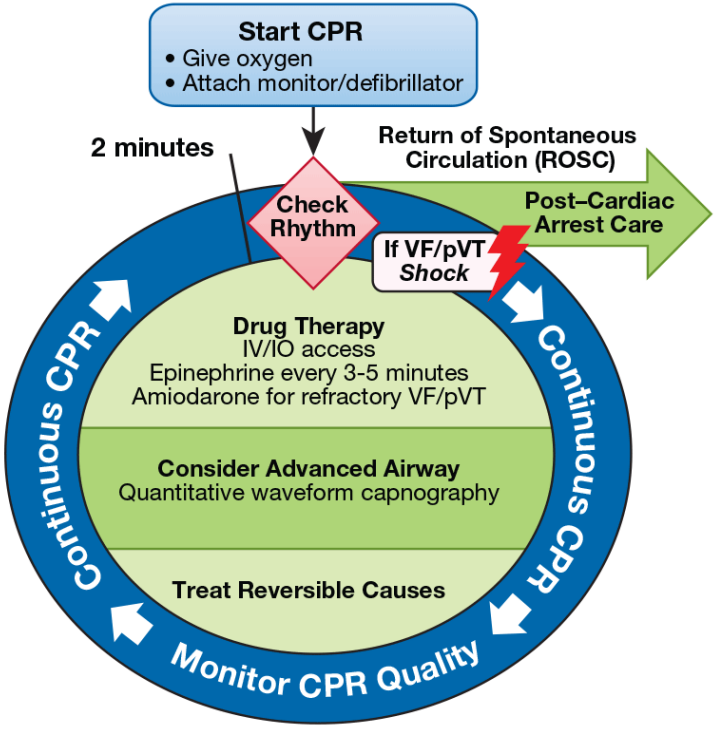
2015 Updates

Figure 5

BLS Healthcare Provider Adult Cardiac Arrest Algorithm—2015 Update



Adult Cardiac Arrest Circular Algorithm—2015 Update



CPR Quality

- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Rotate compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If P_{ETCO_2} <10 mm Hg, attempt to improve CPR quality
- Intra-arterial pressure.
  - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.

Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Drug Therapy

- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in P_{ETCO_2} (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

Pivot to “not in ACLS”

Your first patient of the day

Doctor I need you!

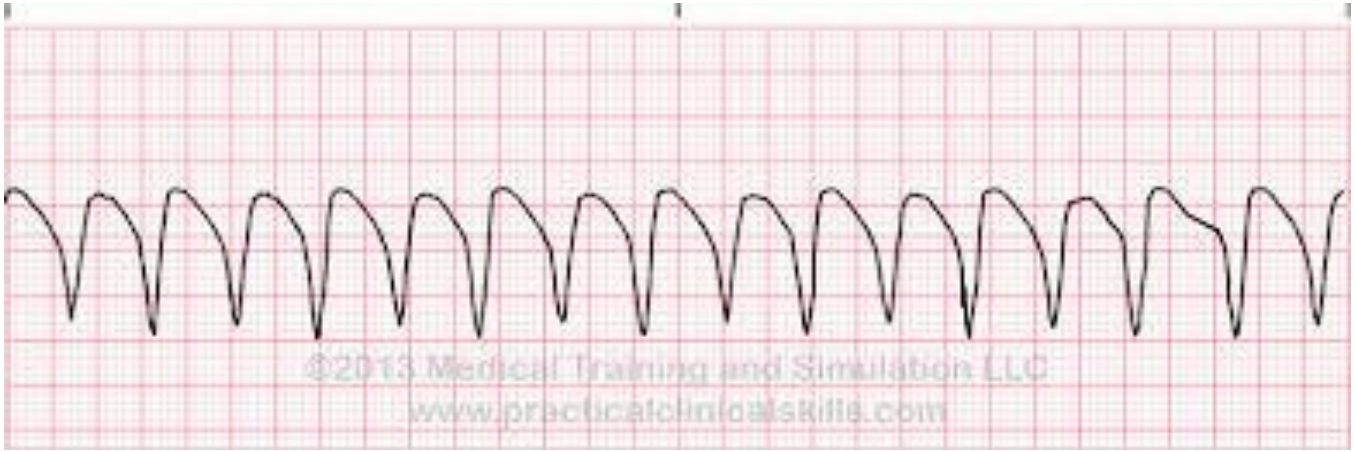

WELL ...
WE'RE WAITING


PROCAINAMIDE
HCl Injection, USP
1 gram/10 mL TOTAL
(100 mg/mL)


I.V. For Cardiac Arrhythmias
2%
LIDOCAINE HCl Inj., USP
100 mg/5 mL
LifeShield
100 mg


598760
AMIODARONE
HCl INJECTION
FOR IV USE ONLY
150 mg/3 mL
50 mg/mL
Rx ONLY

Seriously?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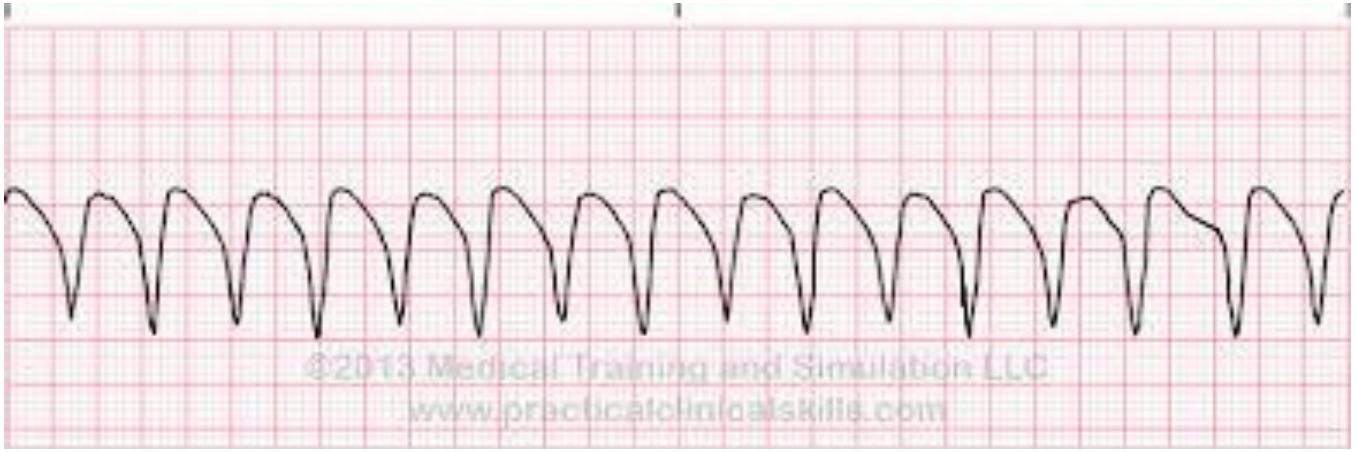
www.practicalclinicalskills.com


96
SYS.
mmHg
54
DIA.
mmHg
78
PUL.
/min
START
wiseGEEK


LIGHT 'EM UP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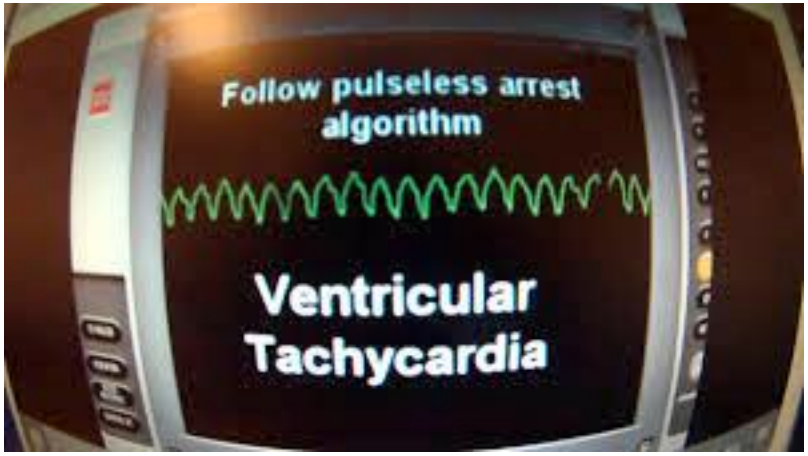
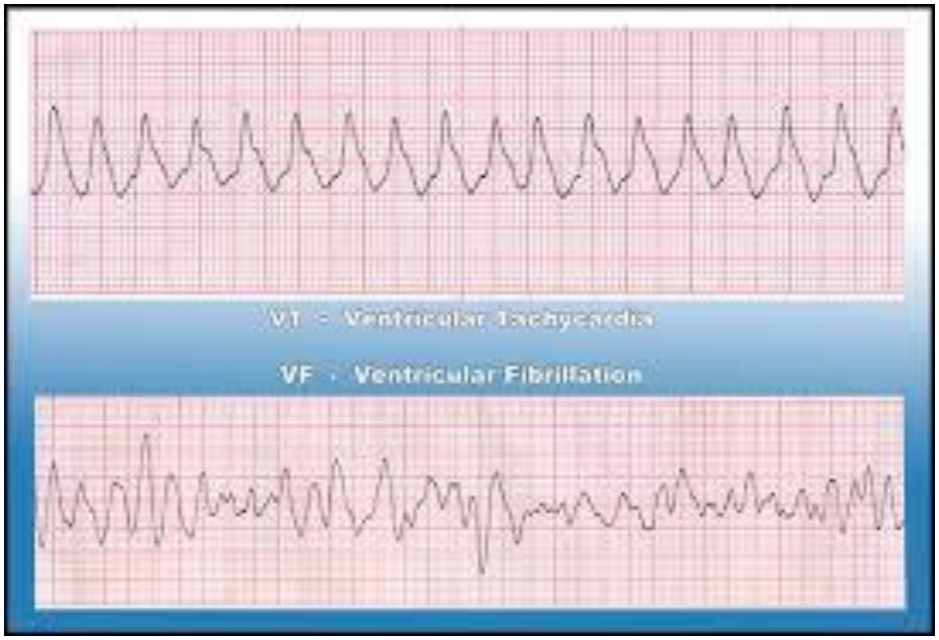
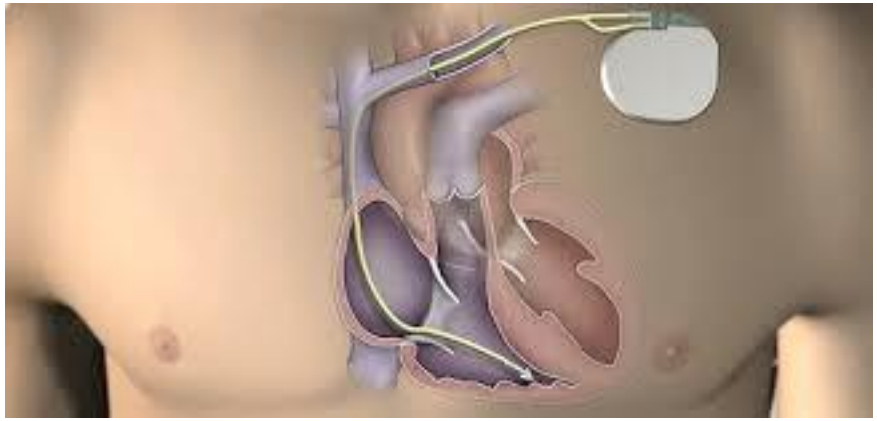

Follow pulseless arrest algorithm
Ventricular Tachycardia


Yes, I am superhuman, but, even I should only do chest compressions for 2 minutes.

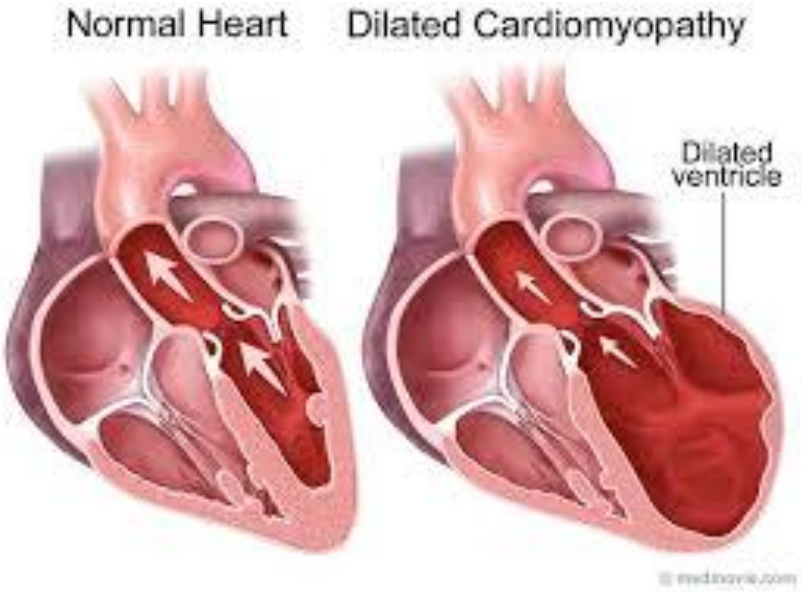
Now what?

Electrical Storm

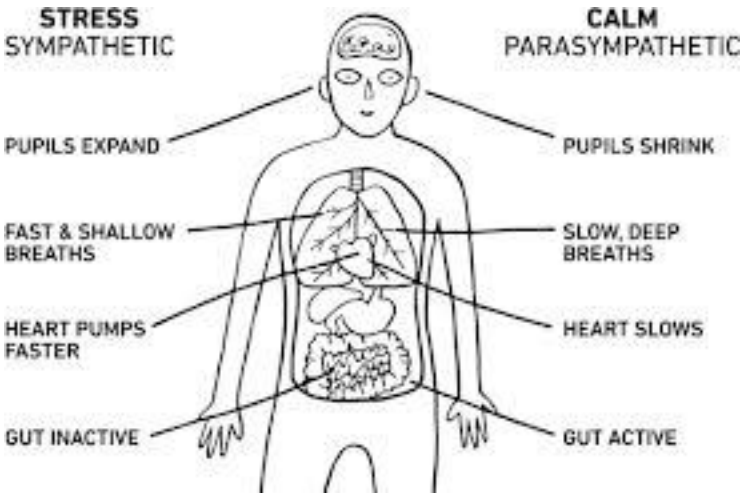


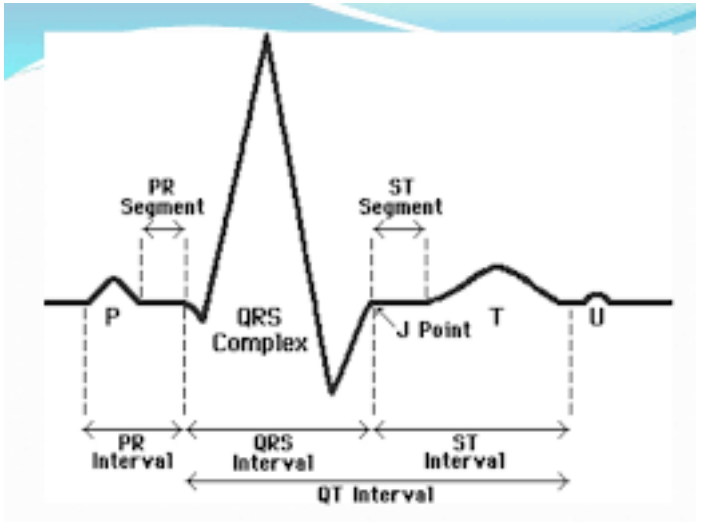


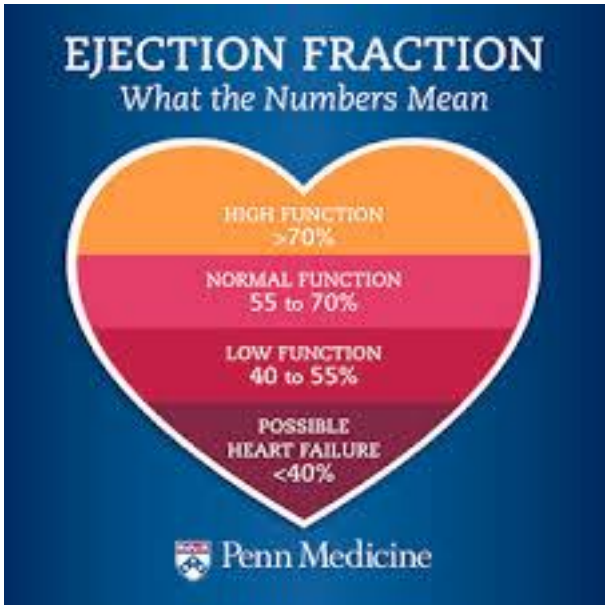
Who?

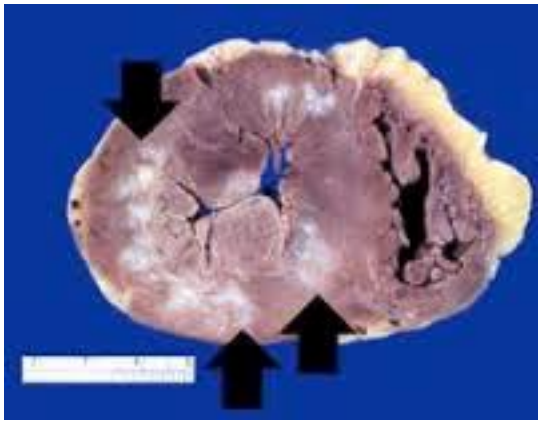


Who?


STRESS
SYMPATHETIC
CALM
PARASYMPATHETIC
PUPILS EXPAND
PUPILS SHRINK
FAST & SHALLOW BREATHS
SLOW, DEEP BREATHS
HEART PUMPS FASTER
HEART SLOWS
GUT INACTIVE
GUT ACTIVE


PR Segment
ST Segment
P
QRS Complex
J Point
T
U
PR Interval
QRS Interval
ST Interval
QT Interval


EJECTION FRACTION
What the Numbers Mean
HIGH FUNCTION
>70%
NORMAL FUNCTION
55 to 70%
LOW FUNCTION
40 to 55%
POSSIBLE
HEART FAILURE
<40%
Penn Medicine



ELSEVIER

RESUSCITATION

www.elsevier.com/locate/resuscitation

REVIEW PAPER

13-Blockers for the treatment of cardiac arrest from ventricular fibrillation?*

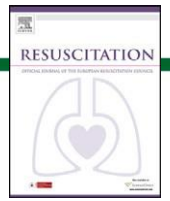
Daniel Bourque[a,*], **Raoul Daoust**[a,b], **V´erilibe Huard**[a,b], **Marco Charneux**[a,b,c]

a *Department of Emergency Medicine, Sacre´-Coeur Hospital, 5400 Gouin Ouest, Montreal, Quebec, Canada H4J 1C5*

b *Faculty of Medicine, University of Montreal, Montreal, Quebec, Canada*

c *Medical Intensive Care Service, Department of Internal Medicine, Sacre´-Coeur Hospital, Montreal, Quebec, Canada*

Received 10 February 2007 ; received in revised form 1 May 2007; accepted 9 May 2007



Review article

Use of beta-blockers for the treatment of cardiac arrest due to ventricular fibrillation/pulseless ventricular tachycardia: A systematic review

Felipe Carvalho de Oliveira[a,b], Gilson Soares Feitosa-Filho[a,b,*], Luiz Eduardo Fonteles Ritt[b,c]

Resuscitation 83 (2012) 674–683

Human Studies

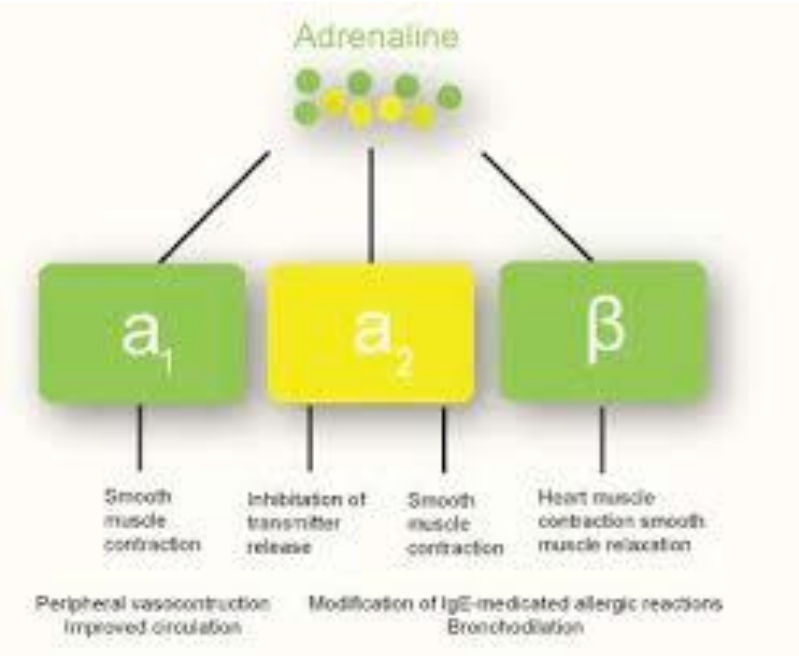
Author	Population	Groups	j3-Blockade Strategy	Results	Notes
Nademanee[34]	49 post-MI patients	(1) ACLS-guided	LSGB (n = 6)	Significant reduction in	Patients were assigned
		therapy (n = 22)	Esmolol (n = 7)	VF episodes	to each treatment arm
		(2) Adrenergic	Propranolol (n = 14)	Better short term (82%	according to physician
		Blockade (n = 27)		vs. 22%) and long term	preference, rather than
				survival (66% vs. 4%) in	randomly assigned
				the	
				adrenergic-blockade	
Miwa[35]	42 consecutive ES	All patients received	Landiolol in increasing	group Overall survival was	Both responders and
	patients	j3-blockade after failure	doses (up to	60%	survivors had lower
		of ACLS-guided therapy	arrhythmia control)	Landiolol was	age and APACHE II
				ineffective in	scores compared to
				arrhythmia control in 9	non-responders and
				patients	non-survivors

Recent Study

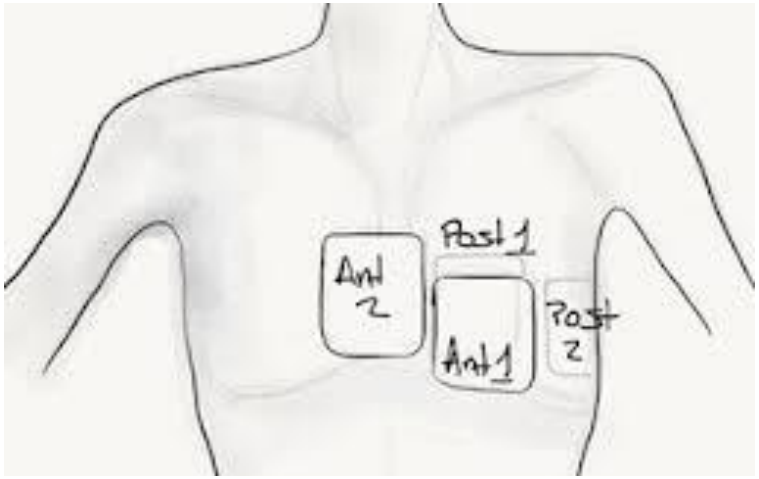
Use of esmolol after failure of standard cardiopulmonary resuscitation to treat patients with refractory ventricular fibrillation.
Driver VE, Debaty G, Plummer DW, Smith SW

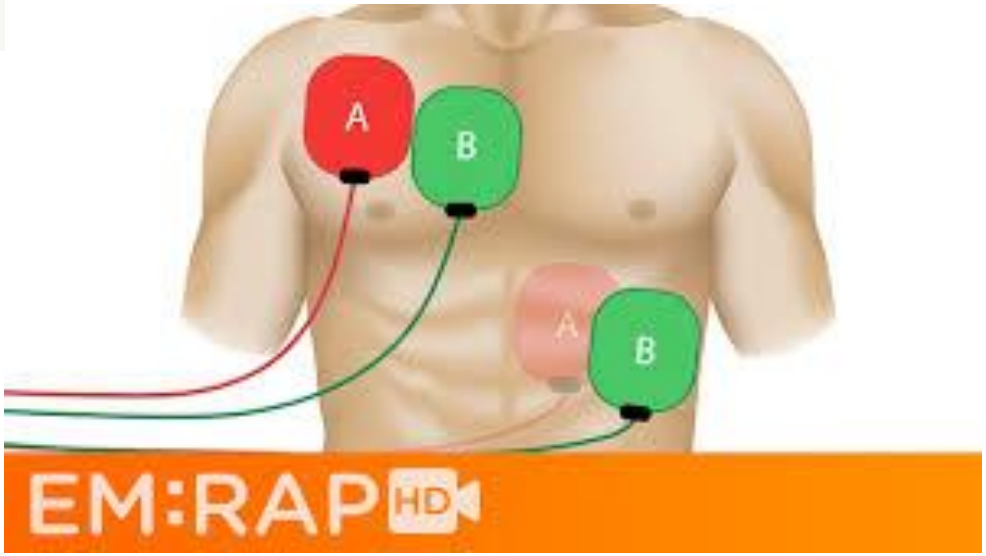
Resuscitation: 2014 Oct;85(10):1337-41. doi: 10.1016/j.resuscitation.2014.06.032. Epub 2014 Jul 14.

What can you do?




Beyond ACLS
Double Simultaneous
External Defibrillation
www.rebelem.com


Post 1
Ant 2
Ant 1
Post 2


A
B
A
B
EM:RAP HD

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Double Defibrillation

http://coreem.net/procedures/defib-pads/

Recent Publication

Double Sequential Defibrillation for Refractory Ventricular Fibrillation and Pulseless Ventricular Tachycardia

The authors discuss the potential benefits of double sequential defibrillation for patients with refractory ventricular fibrillation/pulseless ventricular tachycardia, underscoring the need for further research.

Emergency Medicine. 2017 November;49(11):499-504

Author(s): Leyda Hu, DO, Winny Liang, Pa-C, Richard Cousino, DO, Jason Cheng, DO, Samuel E Perry,

- Cabañas et al, 2014
- retrospective case series of 10 patients
- DSD between 2008 and 2010
- 70% of the patients were successfully converted by DSD out of refractory V-fib
- 0 survived to discharge

- Merlin et al, 2016
- retrospective case series, EMTs delivering DSD in the field
- seven patients
- five of whom (71%) were successfully converted out of V-fib
- four (57%) surviving to hospital admission.

- Cortez et al, 2016
- 12 patients with refractory V-fib treated with DSD found that
- nine patients (75%) converted out of V-fib
- three survived to hospital discharge, with two patients (16.7%) discharged with a CPC of 1

Conclusion

DSD MAY BENEFIT in REFRECTORY VF

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Stellate Ganglion Block

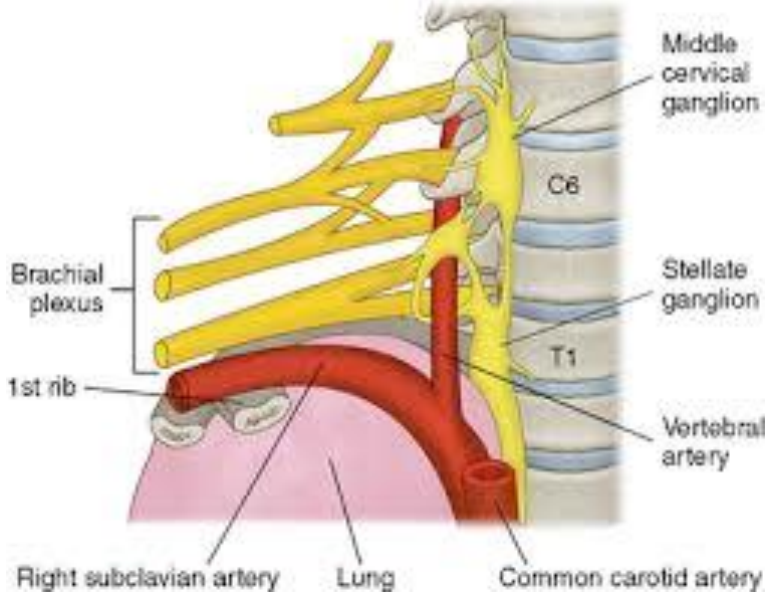

ARE YOU CRAZY?
memegenerator.net

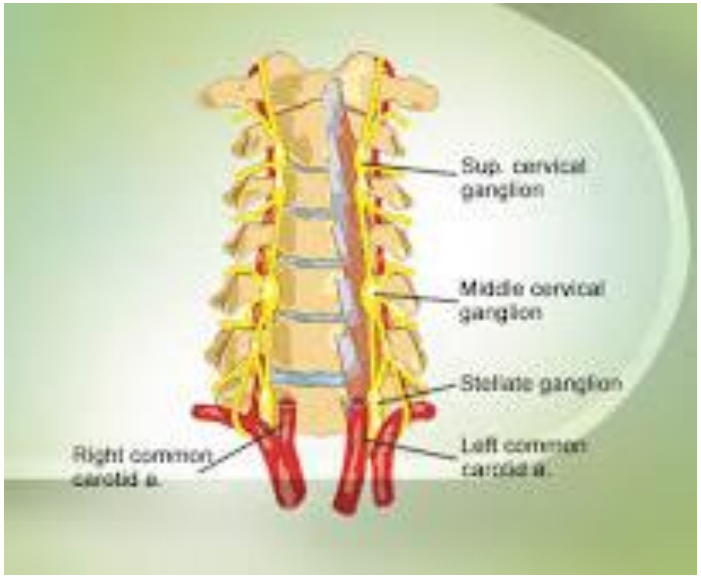
Why Stellate Ganglion Block

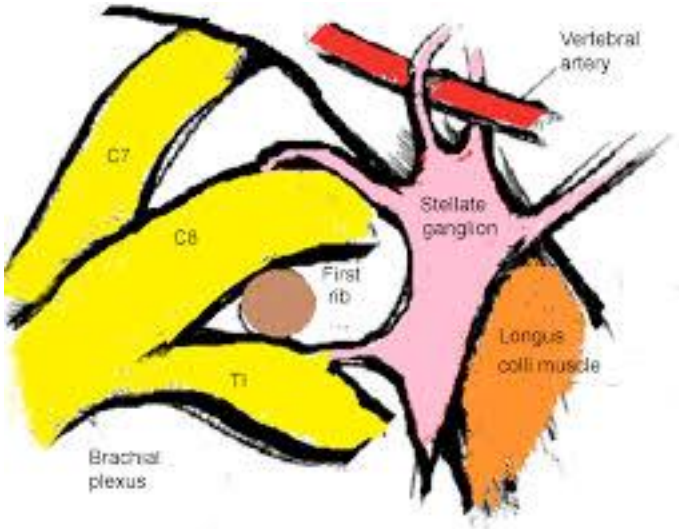
Circulation. 2000 Aug 15;102(7):742-7.

Treating electrical storm : sympathetic blockade versus advanced cardiac life support-guided therapy.

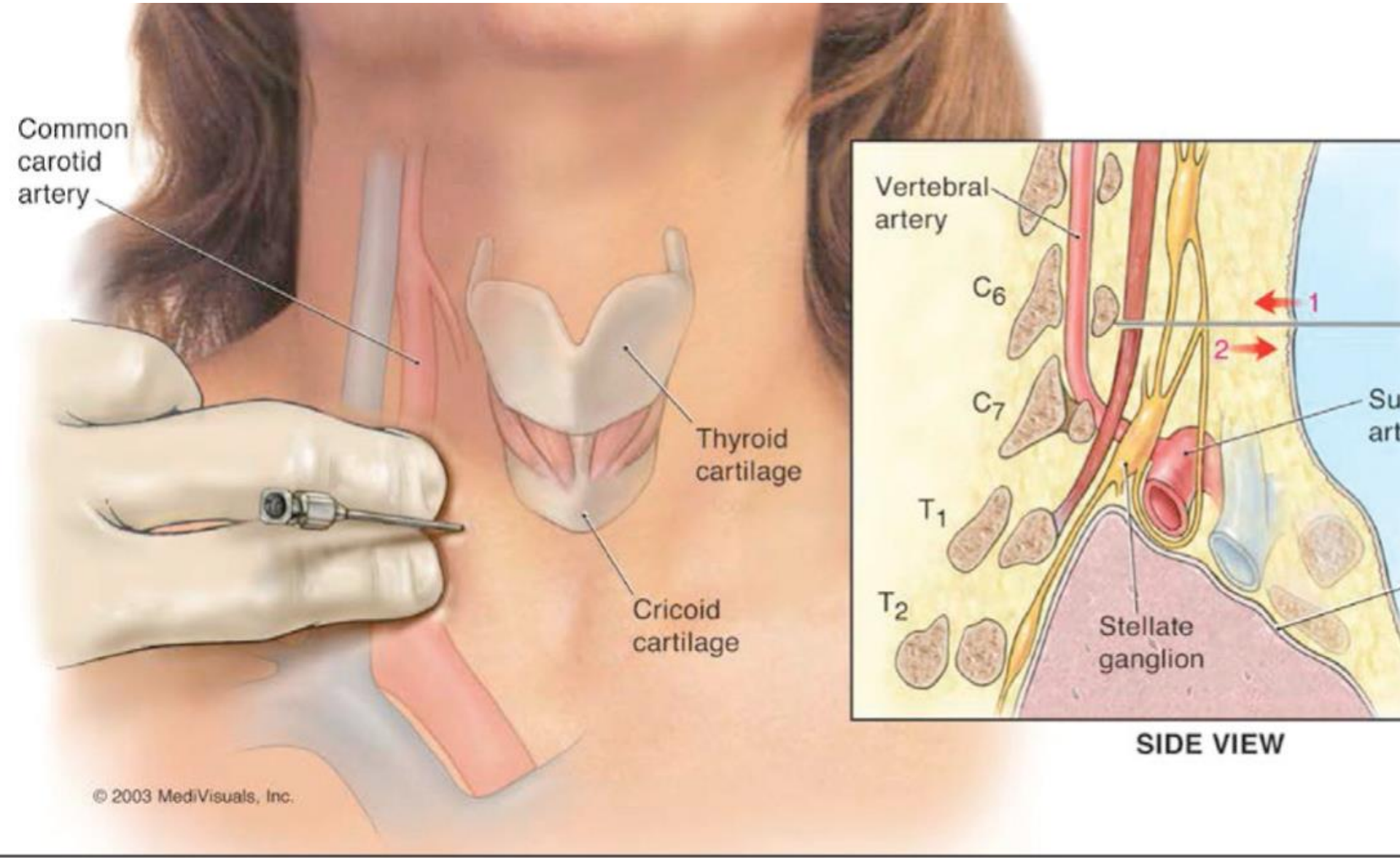
Nademanee K, Taylor R, Bailey WE, Reiders DE, Kosar EM.

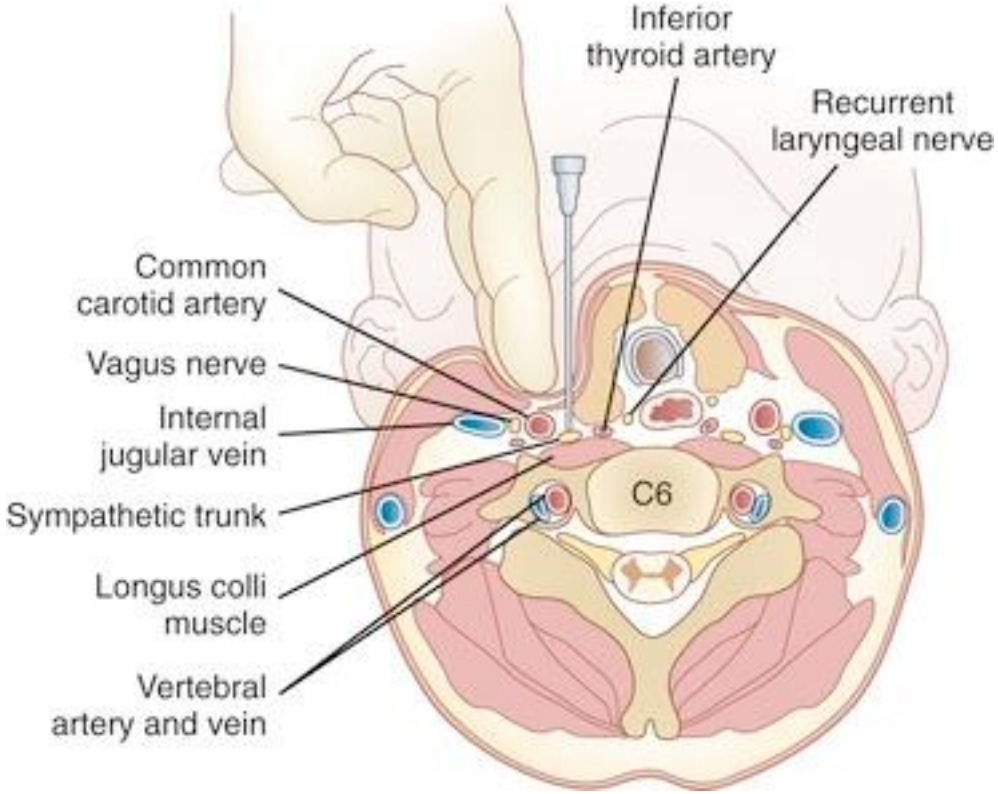

Middle cervical ganglion
C6
Brachial plexus
Stellate ganglion
T1
1st rib
Vertebral artery
Right subclavian artery
Lung
Common carotid artery

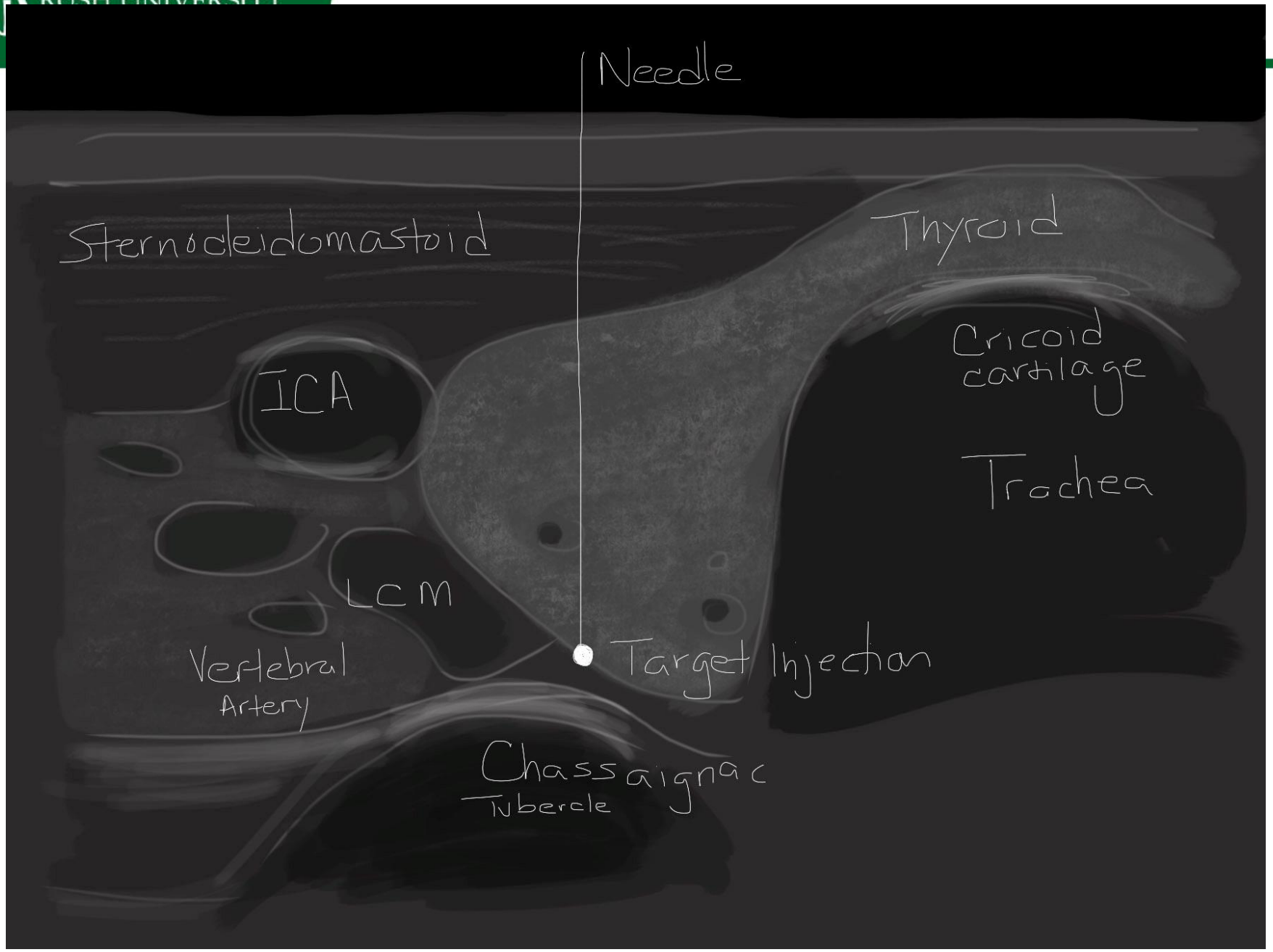

Sup. cervical ganglion
Middle cervical ganglion
Stellate ganglion
Right common carotid a.
Left common carotid a.

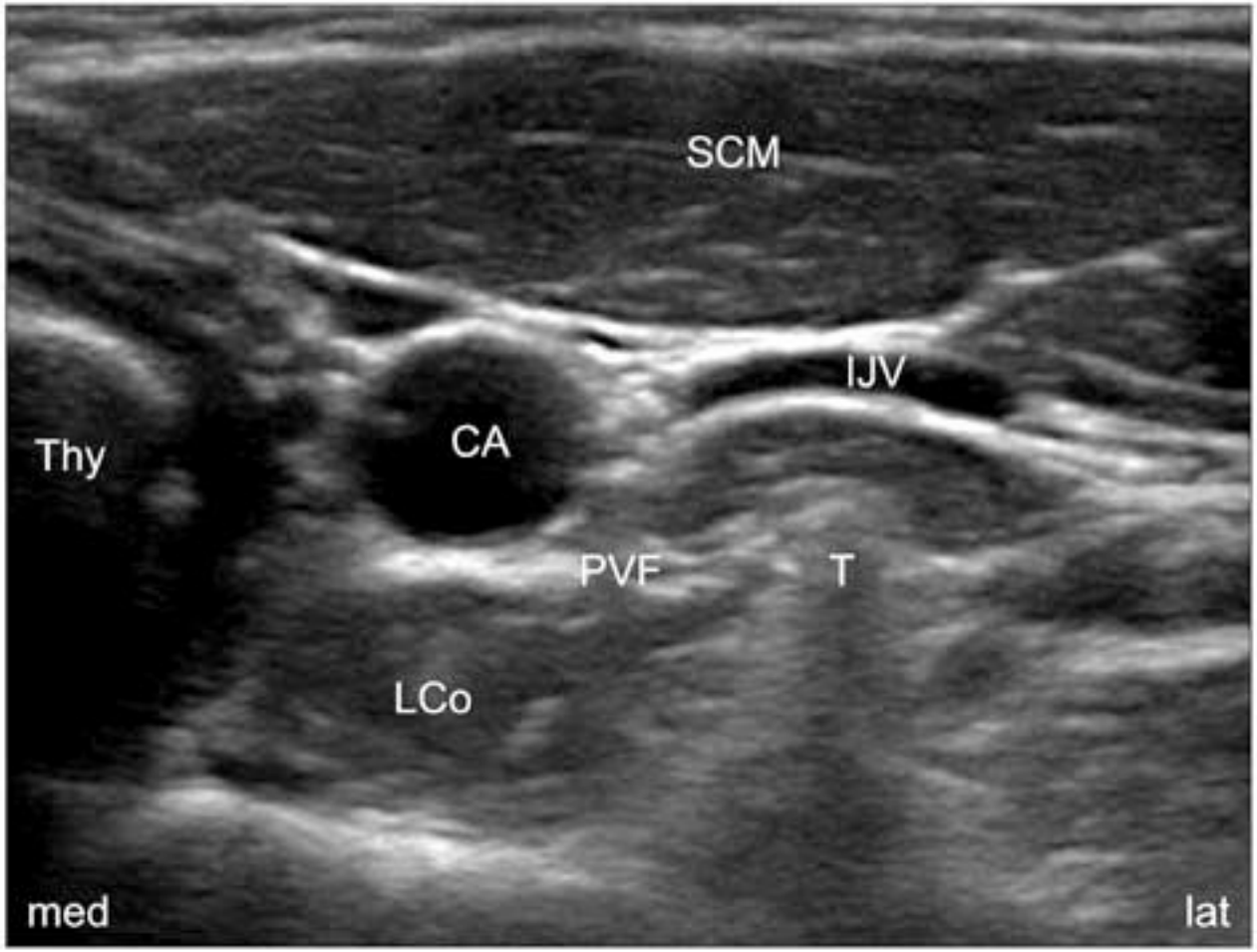

Vertebral artery
C7
C8
Stellate ganglion
First rib
Longus colli muscle
T1
Brachial plexus

Left stellate ganglion block




Inferior
thyroid artery
Recurrent
laryngeal nerve
Common
carotid artery
Vagus nerve
Internal
jugular vein
Sympathetic trunk
Longus colli
muscle
Vertebral
artery and vein
C6


Needle
Sternocleidomastoid
Thyroid
Cricoid cartilage
ICA
Trachea
LCM
Vertebral Artery
Target Injection
Chassaignac Tubercle


SCM
IJV
CA
Thy
PVF
T
LCo
med
lat

Summary

- CPR only for non-trained personal for cardiac arrest is sufficient.
- BB blockers could be used in refractory VF arrest to decreased myocardial oxygen demand.
- Double Sequential Fibrillation may improve patients' chances for ROSC.
- Left Stellate Ganglion Block could be the treatment of choice in Electrical Storm to block sympathetic stimulation.

Post-test

1. **The following medication category decreases myocardial oxygen demand**
   a. Beta-adrenergic blocking (beta-blockers) agents
   b. Beta-adrenergic agonist agents
   c. Vasopressin
   d. Alpha-adrenergic agonist agents

Post-test

2. **In adult patients, mouth-to-mouth resuscitation is absolutely imperative during CPR by untrained provider to improve patients' survival**
   a. True
   b. False

Post-test

3. **There is ample evidence that beta-blockers alone could be used in VF/VT arrest**
   a. True
   b. False

Post Test

4. DSD does not work in refractory VF arrest, and should not be used, ever.

a. True

b. False

Post-test

5. Left Stellate Ganglion block could be used to control electric storm.

a. True

b. False


thank you
danke
謝謝
рахмат
ngiyabonga
teşekkür ederim
спасибо
Баярлалаа
gracias
dank je
bedankt
dziękuję
obrigado
merci
go raibh maith agat
sukriya
kop khun krap
terima kasih
grazie
arigatô
dakujem
mochchakkeram
tapadh leat
mauruuru
hvala
köszönöm
faafetai lava
kiitos
dankie
dhanyavad
nanni
nandri
bayarlalaa
grâcie
enkosi
sobodi
děkuji
mèsi
sagolun
didi madloba
kam sah hamnida
rahmat
najis tuke
তোমাকে ধন্যবাদ
감사합니다
ありがとう
xièxie
ευχαριστώ
diolch
dhanyavadagalu
shukriya
merci
мерси
trugarez
takk
tanemirt
rahmet
taiku
sulpáy
gràcies
gratias ago
chnorakaloutioun
akun
dankon
aciū
vinaka
спасибі
blagodaram
misaotra
matondo
paldies
grazzi
mahalo
barka
welalin
tack
mersi
kia ora
spas
djiere dieuf
tau
дякую
mamnun
asante
manana
obrigada
tenki
murakoze
chokrane
хвала