

YES  
NURSES  
DO HAVE  
A HEART!



WHAT IS  
WRONG  
WRONG WITH  
THIS EKG?

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IMPORTANT INFORMATION  
FOR READERS

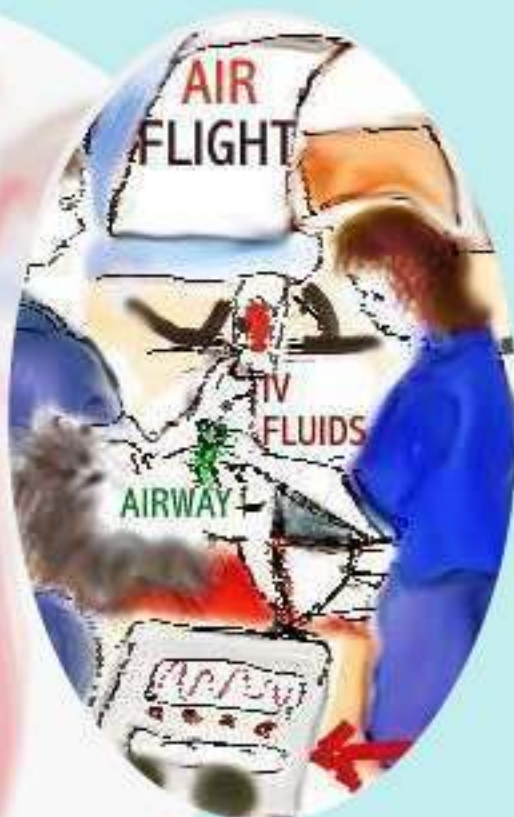
HOW IS YOUR  
PAIN ON A  
SCALE OF  
1-10?



MODERATE

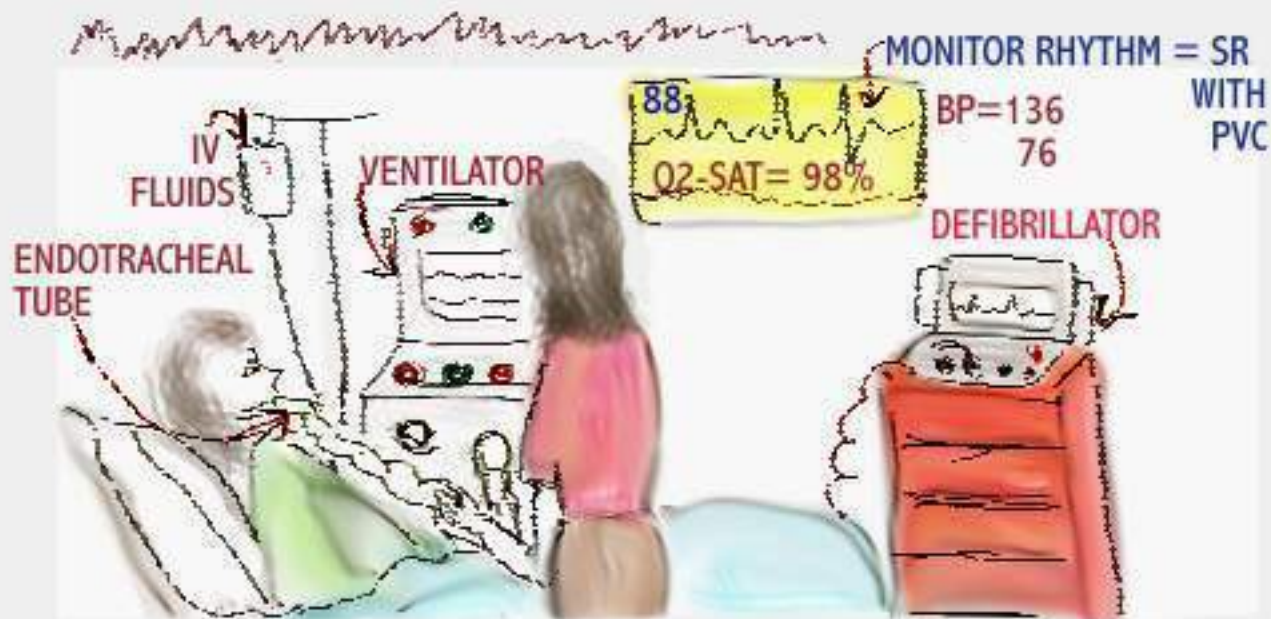


7-10 SEVERE PAIN



THIS EKG SERIES - "WHAT IS WRONG WITH THIS EKG?" IS DESIGNED TO MAKE LEARNING ABOUT EKG READING SIMPLE AND ENJOYABLE. IT IS HOWEVER, NOT INTENDED AS A SUBSTITUTE FOR YOUR INSTITUTION'S POLICIES AND PROCEDURES OR DOCTOR'S ORDERS. SO, ENJOY LEARNING WITH THESE ILLUSTRATIONS!

# VENTRICULAR FIBRILLATION



WHAT IS WRONG WITH THIS EKG

A COLLECTION OF THE MOST COMMON CARDIAC RHYTHMS SEEN IN THE CLINICAL SETTING.

SINUS RHYTHMS

VENTRICULAR RHYTHMS


AV BLOCKS

PEA

ATRIAL RHYTHMS


ASYSTOLE

What kind of patient education did this patient receive?

A cartoon illustration of a woman sitting up in a hospital bed. She is wearing a hospital gown and has a nasal cannula in her nose. To her left is an oxygen tank. A bedside table with a lamp and a clock is next to her. A speech bubble points to her.

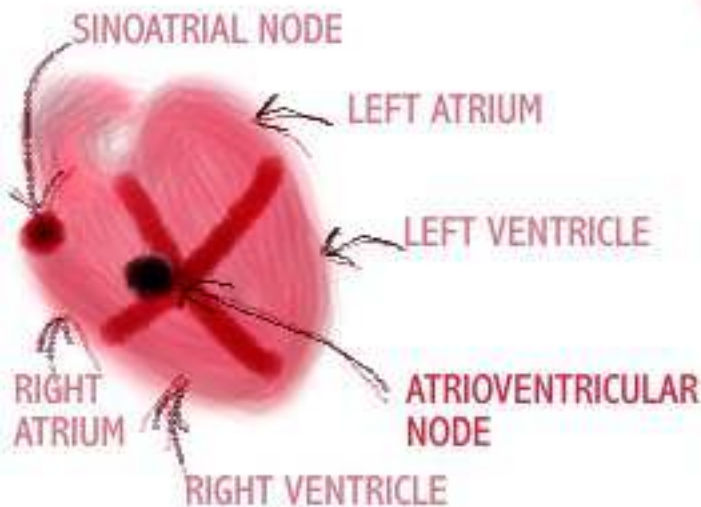
Honey, I need you to bring me my cigarettes. Since this chest pain started, I have not had a cigarette.

**ADVISE PATIENT  
OF THE  
DANGER OF  
SMOKING WITH  
OXYGEN  
RUNNING!**

An arrow pointing from the text to the nasal cannula.

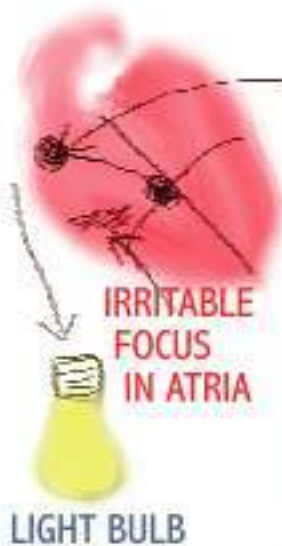
oxygen flow via nasal cannula

## UNDERSTANDING EKG WAVES



THE HEART IS A PUMP THAT WORKS TO SUPPLY BLOOD TO ALL THE BODY'S ORGANS AND TISSUES.

SINOATRIA NODE - REFERRED TO AS THE PACEMAKER OF THE HEART. WHEN THE SINOATRIAL NODE FIRES, THE RIGHT AND LEFT ATRIA CONTRACT AND FORCE BLOOD INTO THE VENTRICLES. THE RIGHT AND LEFT SIDE OF THE HEART HAVE DIFFERENT FUNCTIONS.

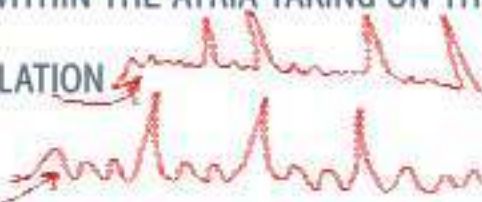


THE SINOATRIAL NODE IS PART OF THE ELECTRICAL CONDUCTION SYSTEM OF THE HEART. IT CAN BE COMPARED TO A LIGHT WHICH IS SWITCHED ON. ELECTRICAL ACTIVITY IS USED TO PUT THE LIGHT BULB ON AND THE ELECTRICAL SYSTEM OF THE HEART HAS TO WORK CORRECTLY FOR THE SINOATRIAL NODE TO FIRE.

IF THERE IS ANY EXISTING INJURY WHETHER BY DISEASE OR INJURY SUCH AS MYOCARDIAL INFARCTION, THE SINOATRIAL NODE MAY LOSE ITS ABILITY TO FIRE AT THE RIGHT TIME. THIS MAY RESULT IN AN IRRITABLE FOCUS WITHIN THE ATRIA TAKING ON THE ROLE OF THE SINOATRIAL NODE.

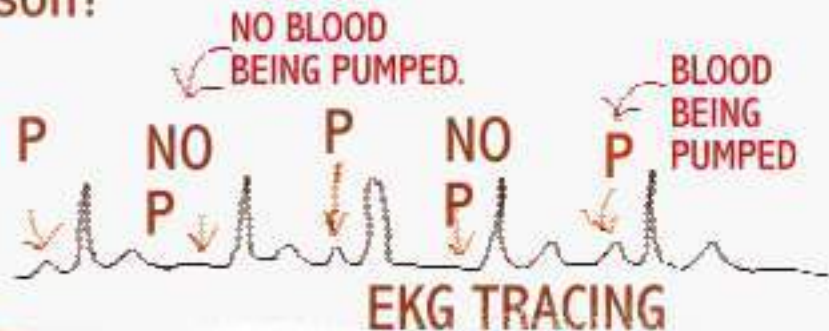
RHYTHMS SUCH AS ATRIAL FIBRILLATION

OR ATRIAL FLUTTER MAY RESULT.



# WHAT IS WRONG WITH THIS EKG?

Pam is having chest pain and shortness of breath.  
What is the reason?



IF THE PACEMAKER OF THE HEART (SINOATRIA NODE) DOES NOT FIRE REGULARLY, THEN BLOOD FLOW WILL BE AFFECTED.

SINUS BRADYCARDIA = HEART RATE < 60

SINUS RHYTHM = HEART RATE 60-100

SINUS TACHYCARDIA = HEART RATE > 100

ALL THREE RHYTHMS HAVE THE NORMAL P, QRS AND T. THE ONLY DIFFERENCE IS THE HEART RATE.

SA NODE IS LIKE A LIGHT THAT IS TURNED ON

**SA NODE**

FIRES AND THE ATRIA CONTRACT

**AV NODE**

FIRES AND THE VENTRICLES CONTRACT



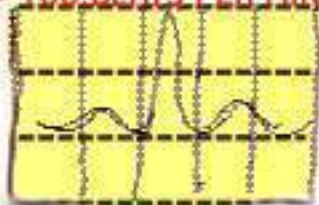
**QRS**  
= VENTRICULAR CONTRACTION

**T**  
= RESTING TIME BEFORE NEXT CONTRACTION

THE HEART IS A PUMP WHICH PUMPS BLOOD ALL AROUND THE BODY. THE HEART HAS 4 CHAMBERS. THERE ARE 2 UPPER AND 2 LOWER.

IT HAS AN ELECTRICAL SYSTEM WHICH WORKS TO STIMULATE CONTRACTION OF ITS CHAMBERS. THE EKG REFLECTS NORMAL OR ABNORMAL FUNCTION OF THE ELECTRICAL SYSTEM.

TYPICALLY, SINUS TACHYCARDIA IS THE TERM USED FOR A HEART RATE  $> 100$  BEATS PER MINUTE.



CAUSES INCLUDE FEVER, EXERCISE, ANXIETY, STRESS AND MORE. FURTHER ASSESSMENT IS NEEDED.

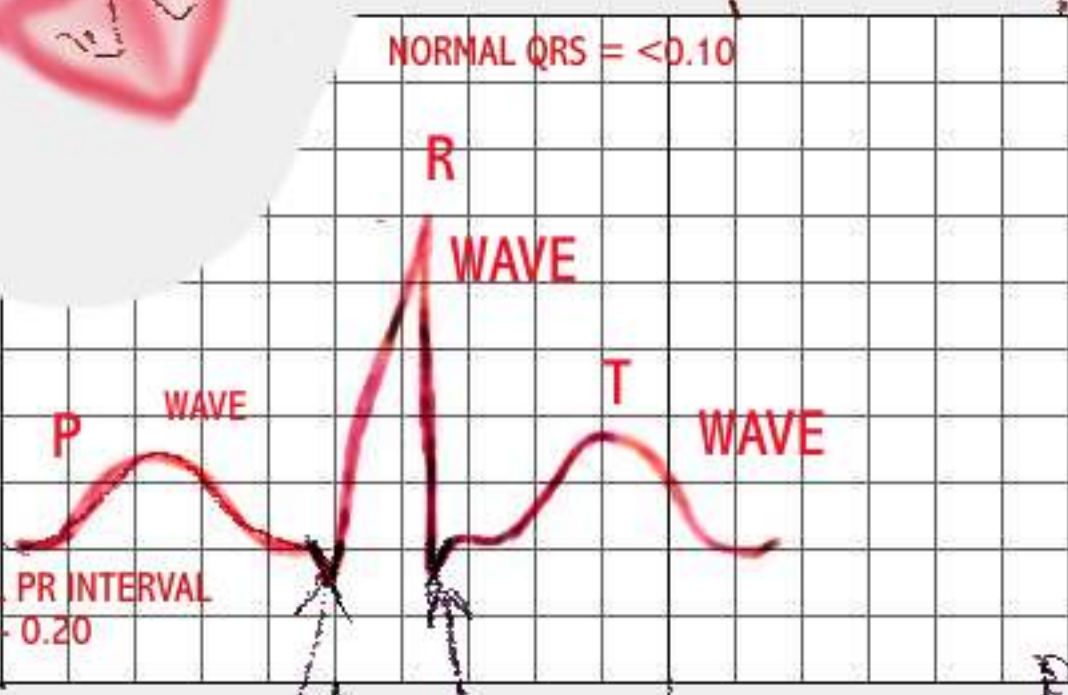
SINUS RHYTHM IS THE TERM USED WHEN THE HEART IS BEATING NORMALLY. THE ACCEPTED RATE IS 60- 100 BEATS PER MINUTE.

SINUS BRADYCARDIA IS THE TERM USED WHEN THE HEART RATE IS  $< 60$  BEATS PER MINUTE. ATHLETES MAY NATURALLY HAVE A SLOW HEART RATE WITHOUT SYMPTOMS. SOME PATIENTS MAY HAVE SYMPTOMS OF CHEST PAIN, SHORTNESS OF BREATH AND HYPOTENSION. THIS WILL REQUIRE FURTHER ASSESSMENT.



THE DISTANCE BETWEEN THESE 5 BOXES = 0.20 SECONDS

NORMAL QRS = <0.10



NORMAL PR INTERVAL = 0.12 - 0.20

Q WAVE  
S WAVE

EACH BOX = 0.04 SECONDS

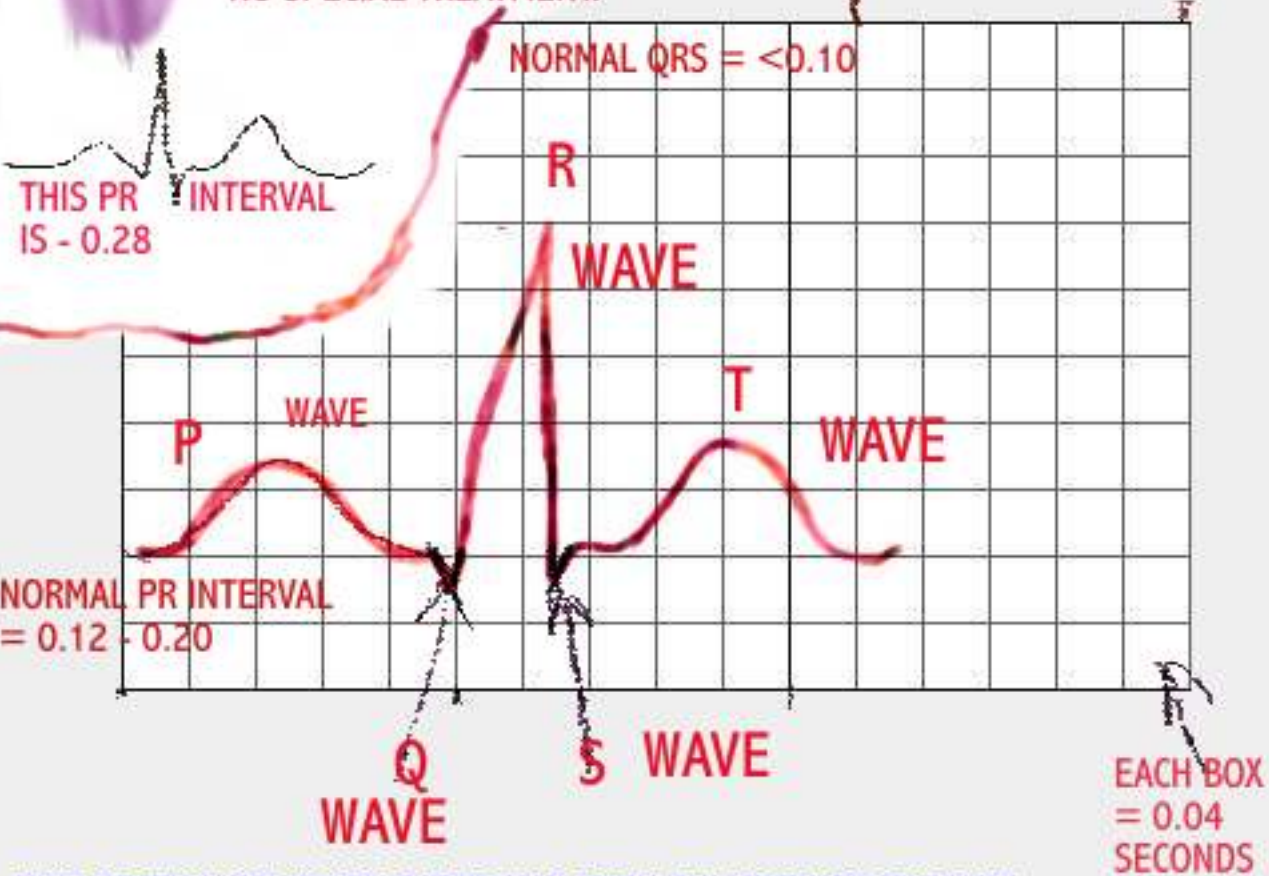
THIS SECTION OF GRAPH PAPER HAS BEEN ENLARGED TO MAKE LEARNING EASIER.

# WHAT IS WRONG WITH THIS EKG?



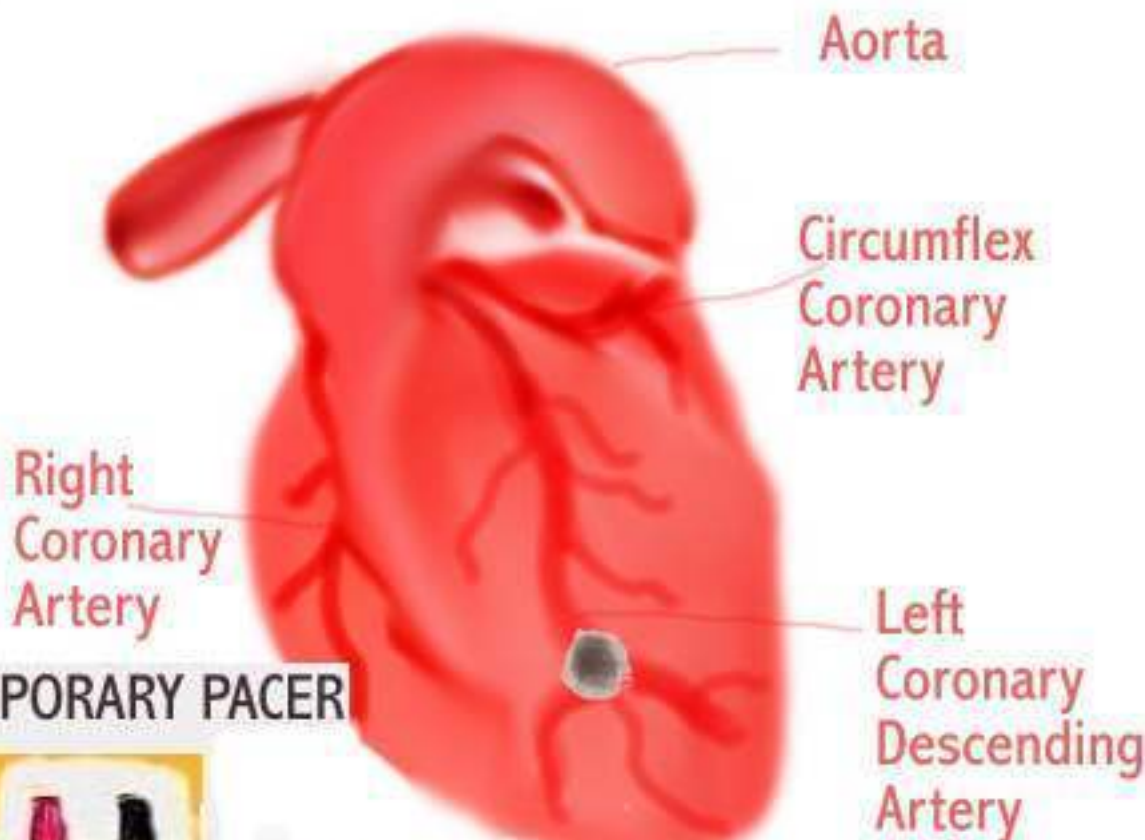
JOHN HAS A FIRST DEGREE AV BLOCK. HIS PR-INTERVAL MEASURES 0.28. THIS CONDITION IS USUALLY BENIGN AND REQUIRES NO SPECIAL TREATMENT.

THE DISTANCE BETWEEN THESE 5 BOXES = 0.20 SECONDS

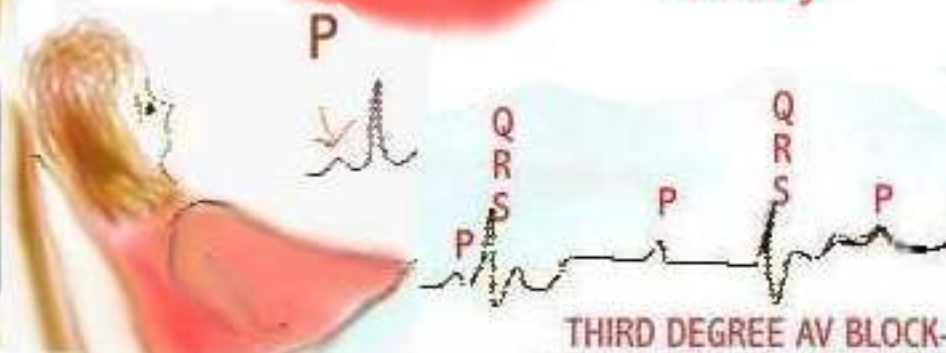
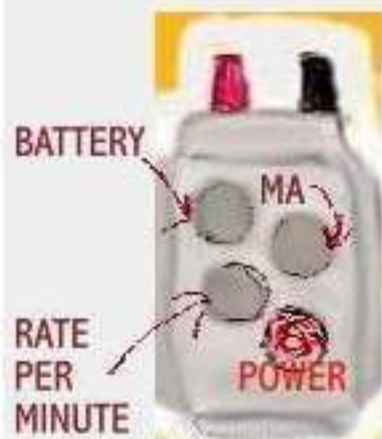


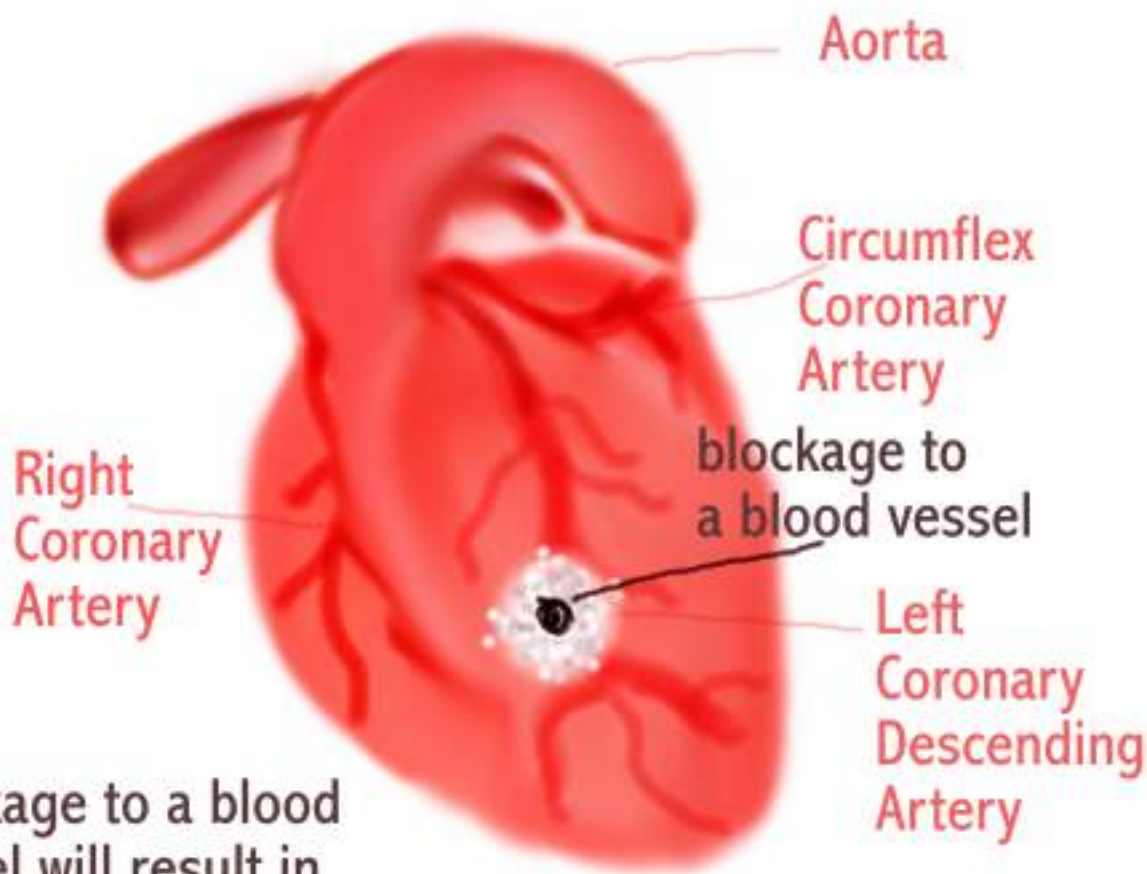
THIS SECTION OF GRAPH PAPER HAS BEEN ENLARGED TO MAKE LEARNING EASIER.

# DEFINING HEART BLOCKS



## TEMPORARY PACER

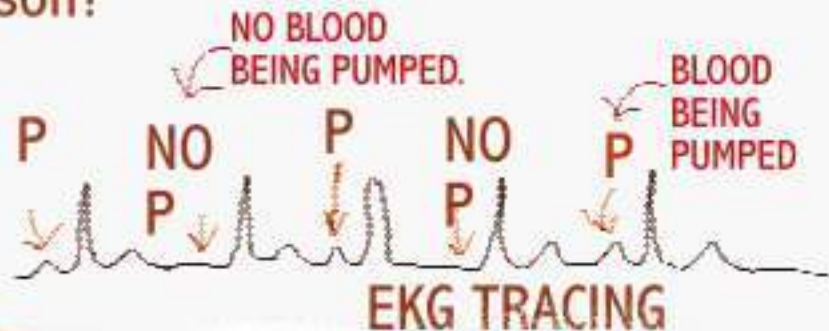




Blockage to a blood vessel will result in either ischemia or infarction. Both ischemia and infarction will reduce the amount of oxygen supplied by that blood vessel.

# WHAT IS WRONG WITH THIS EKG?

Pam is having chest pain and shortness of breath.  
What is the reason?



IF THE PACEMAKER OF THE HEART (SINOATRIA NODE) DOES NOT FIRE REGULARLY, THEN BLOOD FLOW WILL BE AFFECTED.

SINUS BRADYCARDIA = HEART RATE < 60

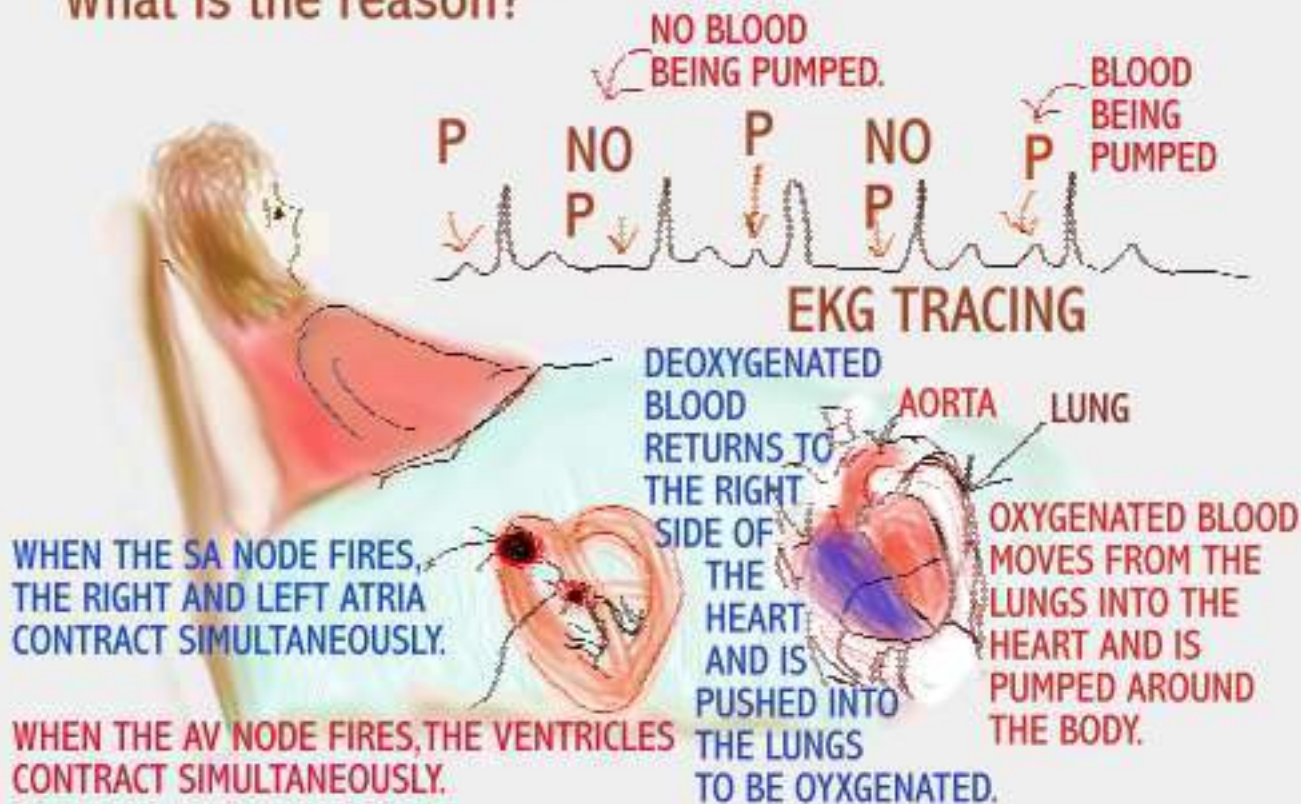
SINUS RHYTHM = HEART RATE 60-100

SINUS TACHYCARDIA = HEART RATE > 100

ALL THREE RHYTHMS HAVE THE NORMAL P, QRS AND T. THE ONLY DIFFERENCE IS THE HEART RATE.

# WHAT IS WRONG WITH THIS EKG?

Pam is having chest pain and shortness of breath. What is the reason?



DURING CONTRACTION OF THE HEART'S CHAMBERS, BLOOD IS FORCED FROM THE RIGHT ATRIA TO THE RIGHT VENTRICLE AND FROM THERE, INTO THE LUNGS TO BE OXYGENATED.

THE LEFT ATRIA CONTRACTS FORCING BLOOD INTO THE LEFT VENTRICLE, WHICH THEN CONTRACTS FORCING BLOOD AROUND THE BODY VIA THE AORTA.

# PACEMAKER INTERVENTION

WIRES ARE INSERTED INTO THE HEART VIA THE VEINS AND ATTACHED TO A PULSE GENERATOR ( THE PACEMAKER). THE PACEMAKER HAS A BATTERY INSIDE .



PACING WIRES MAY BE IMPLANTED IN THE ATRIA, VENTRICLE OR BOTH CHAMBERS. THE EKG TRACING WILL SHOW WHAT KIND OF PACEMAKER IS IN PLACE.

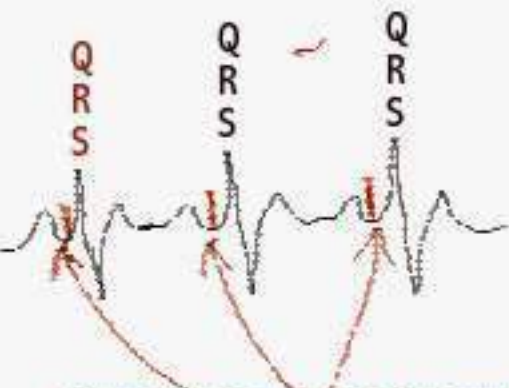
PACEMAKER IMPLANTATION - A SMALL DEVICE CAN BE FELT UNDER THE SKIN.

PAM CONTINUES TO HAVE CHEST PAIN AND SHORTNESS OF BREATH. DIZZINESS AND HYPOTENSION ARE ALSO BEGINNING TO SET IN.

HER OWN NATURAL PACEMAKER IS NOT FUNCTIONING WELL. HER CARDIOLOGIST EVALUATES HER CARDIAC STATUS AND DECIDES TO HAVE A PERMANENT PACEMAKER INSERTED.

THE DOCTOR SETS THE PACEMAKER TO TRIGGER A CERTAIN NUMBER OF HEART BEATS PER MINUTE OR SOMETIMES THE PACEMAKER MAY BE SET TO DISCHARGE ONLY IF THE NATURAL PACEMAKER ( SA NODE) DOES NOT FIRE.

**ARTIFICIAL PACEMAKER WITH WIRES**

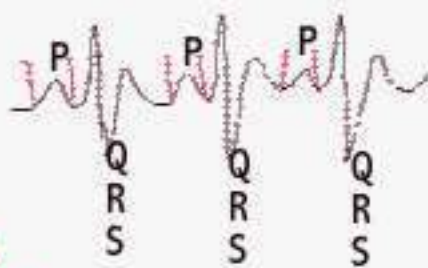


A SAMPLE OF AN EKG SHOWING A PACEMAKER LEAD (WIRE) IN THE VENTRICLE. THERE IS NORMALLY A SPIKE IN FRONT OF THE QRS. THE SPIKE MAY NOT APPEAR IF THE PACEMAKER MALFUNCTIONS.

**AN OVERVIEW OF PACEMAKERS**

PACEMAKER IMPLANTATION MAY BE DONE FOR DIFFERENT REASONS. ANY DAMAGE TO THE HEART MUSCLE OR THE ELECTRICAL CONDUCTION WHICH WILL INTERFERE WITH THE ABILITY OF THE HEART TO FUNCTION NORMALLY, MAY BE INDICATIONS FOR A PACEMAKER. SICK SINUS SYNDROME (THOUGH RARE) OR MYOCARDIAL INFARCTION ARE EXAMPLES.

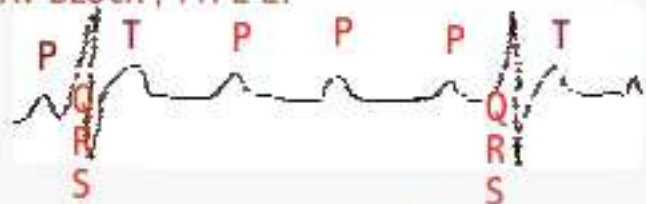
PATIENTS WHO HAVE DYSFUNCTION OF THEIR OWN NATURAL PACEMAKER MAY EXPERIENCE DIZZINESS, SYNCOPAL EPISODES (TEMPORARY LOSS OF CONSCIOUSNESS), CHEST PAIN, SHORTNESS OF BREATH, FATIGUE AND A DECREASE IN BLOOD PRESSURE (HYPOTENSION). THESE SYMPTOMS ARE DUE TO A LACK OF BLOOD FLOW TO THE BODY'S ORGANS.



SPIKES IN FRONT OF P AND QRS MEANS BOTH CHAMBERS ARE PACED.

## WHAT IS WRONG WITH THIS EKG?

IN A NORMAL EKG, THERE IS A P WAVE BEFORE EACH QRS COMPLEX. IN THIS RHYTHM, THERE ARE 2 P WAVES WITHOUT A QRS COMPLEX FOLLOWING. THIS IS A SECOND-DEGREE AV BLOCK, TYPE 2.



MR. W IS 55 YEARS OLD. HE HAS BEEN SHOVELLING SNOW FOR OVER 30 MINUTES.

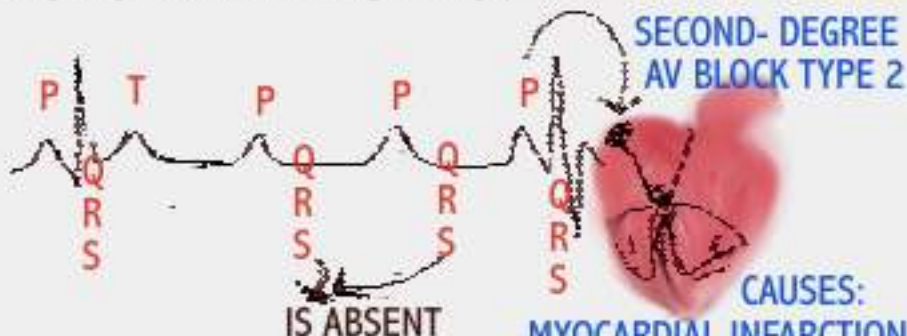
SUDDENLY, HE FEELS LIGHTEADED AND STARTS TO HAVE SHARP PAIN IN THE CHEST, RADIATING TO THE JAW.

MR. W WAS FORTUNATE. HE CALLED 911 AND WAS IMMEDIATELY TAKEN TO THE ER FOR CARDIAC EVALUATION.

# WHAT IS WRONG WITH THIS EKG?

OXYGEN VIA  
NASAL CANNULA  
AT 3L/MIN

OXYGEN



CAUSES:  
MYOCARDIAL INFARCTION  
( HEART ATTACK),  
DIGITALIS TOXICITY.

WHEN THE SINOATRIA NODE FIRES AND THE ELECTRICAL CONDUCTION IS NOT TRANSFERRED TO THE VENTRICLE, BLOOD WILL NOT BE PUMPED AS NORMAL. PATIENTS WHO EXPERIENCE THIS TYPE OF RHYTHM MAY EXPERIENCE CHEST PAIN, SHORTNESS OF BREATH, LIGHTEADNESS, DIZZINESS, SLOWING OF THE HEART RATE ( BRADYCARDIA) AND A DROP IN BLOOD PRESSURE .

SECOND-DEGREE AV BLOCK TYPE 1

CAUSES:



MYOCARDIAL INFARCTION ( HEART ATTACK) INVOLVING THE INFERIOR WALL OF THE HEART, DRUGS WHICH SLOW THE HEART RATE LIKE BETA BLOCKERS OR DIGITALIS.

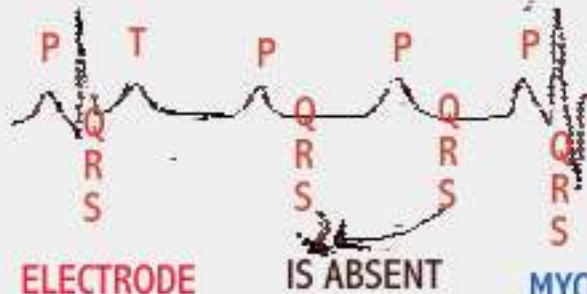
# WHAT IS WRONG WITH THIS EKG?

MOBITZ TYPE 2

SECOND-DEGREE AV BLOCK TYPE 2

OXYGEN VIA NASAL CANNULA AT 3L/MIN

OXYGEN



ELECTRODE IS ABSENT

CAUSES: MYOCARDIAL INFARCTION (HEART ATTACK), DIGITALIS TOXICITY.

MR. W HAD A MYOCARDIAL INFARCTION (HEART ATTACK). HIS HEART WAS NOT ABLE TO PUMP ENOUGH BLOOD. TCP WAS STARTED, UNTIL A PERMANENT PACEMAKER COULD BE INSERTED. TCP- TRANSCUTANEOUS PACING IS BEING USED TO HELP THE HEART.

SYMPTOMS OF LIGHTEADEDNESS, CHEST PAIN AND HYPOTENSION WERE CAUSED BY THE LACK OF CIRCULATION OF BLOOD. 1 ELECTRODE IS PLACED IN FRONT AND 1 IN THE BACK.

## MOBITZ TYPE 1 (WENCKEBACH)

SECOND-DEGREE AV BLOCK TYPE 1



PR INTERVAL LENGTHENS UNTIL QRS IS DROPPED, THEN CYCLE STARTS AGAIN.

CAUSES:

MYOCARDIAL INFARCTION (HEART ATTACK) INVOLVING THE INFERIOR WALL OF THE HEART, DRUGS WHICH SLOW THE HEART RATE LIKE BETA BLOCKERS OR DIGITALIS.

## WHAT IS WRONG WITH THIS EKG?

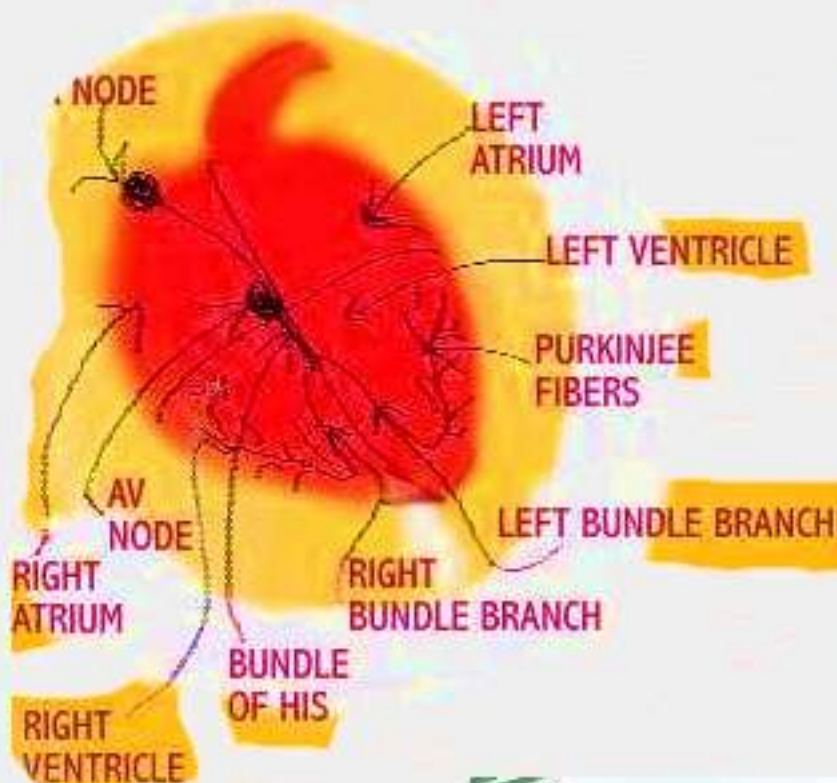


**THIRD DEGREE AV BLOCK- THE ATRIA AND VENTRICLES ARE BEATING INDEPENDENTLY OF EACH OTHER.**

**SAM IS A 48 YEAR OLD MALE WHO HAS HAD 2 PREVIOUS HEART ATTACKS. HE HAD A CABG (CORONARY BYPASS GRAFT) ABOUT 1YEAR AGO.**

**SAM HAS BEEN ENJOYING THE SUNNY WEATHER. HE HAD CHEST DISCOMFORT EARLIER AND TOOK 1 NITROGLYCERIN , SUBLINGUAL. SUDDENLY, HE TRIES TO GET UP AND NOTICES HE IS FEELING DIZZY.**

# AV BLOCK, THIRD DEGREE



CAUSES INCLUDE:-

- DAMAGE TO THE HEART FROM A MYOCARDIAL INFARCTION (HEART ATTACK)
- DRUGS SUCH AS DIGOXIN OR INDERAL WHICH SLOW THE HEART RATE
- COMPLICATIONS OF CARDIAC SURGERY

SYMPTOMS:-

PATIENTS MAY EXPERIENCE:

- DIZZINESS, DECREASE IN LEVEL OF CONSCIOUSNESS
- CHEST PAIN, SHORTNESS OF BREATH
- SLOW HEART RATE, A DECREASE IN URINARY OUTPUT AND HYPOTENSION ( LOW BLOOD PRESSURE)

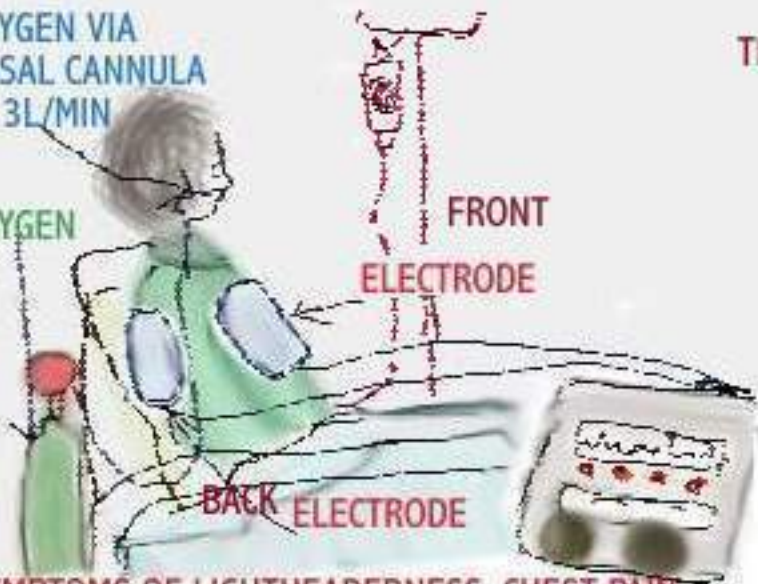


THIRD DEGREE AV BLOCK- THE ATRIA AND VENTRICLES ARE BEATING INDEPENDENTLY OF EACH OTHER.

# WHAT IS WRONG WITH THIS EKG?

OXYGEN VIA  
NASAL CANNULA  
AT 3L/MIN

OXYGEN



## TRANSCUTANEOUS PACING

A TEMPORARY FORM OF PACING USED TO IMPROVE THE CARDIAC OUTPUT UNTIL A PERMANENT PACEMAKER IS INSERTED.

ONE ELECTRODE IS CONNECTED TO THE FRONT AND ONE TO THE BACK OF THE PATIENT. THE RATE IS DETERMINED BY THE DOCTOR. PAIN MEDS AND SEDATION MAY BE NEEDED.

### HELPFUL HINTS:

- KEEP A PATENT AIRWAY
- HISTORY AND PHYSICAL
- FOLLOW MD ORDERS
- MONITOR NEURO STATUS, VITAL SIGNS, O2 SAT AND CARDIAC RHYTHM
- EKG, LAB VALUES AS ORDERED
- RECORD I/O Q 1HR AND NOTIFY MD OF ANY CHANGES
- MEDS AS ORDERED
- \*ALWAYS REPORT ANY SIGNIFICANT CHANGES IN PATIENT'S STATUS

SYMPTOMS OF LIGHTEADEDNESS, CHEST PAIN AND HYPOTENSION WERE CAUSED BY THE LACK OF CIRCULATION OF BLOOD.

1 ELECTRODE IS PLACED IN FRONT AND 1 IN THE BACK.



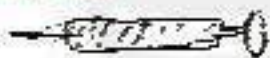
THIRD DEGREE AV BLOCK- THE ATRIA AND VENTRICLES ARE BEATING INDEPENDENTLY OF EACH OTHER.

TREATMENT OF A PATIENT WITH A HEART BLOCK WILL DEPEND ON THE SEVERITY OF THE SYMPTOMS. THE DOCTOR WILL DECIDE WHICH IS THE BEST FORM OF TREATMENT.

## MEDS

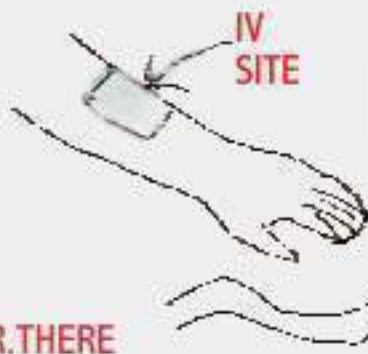


ATROPINE



EPINEPHRINE

## IV LINE



IV INFUSION



SAMPLE OF A TEMPORARY PACERMAKER.THERE ARE MANY VARIETIES AVAILABLE.

## TEMPORARY PACER



WIRES ARE INSERTED INTO THE HEART VIA THE VEINS AND ATTACHED TO A PULSE GENERATOR ( THE PACEMAKER). THE PACEMAKER HAS A BATTERY INSIDE .

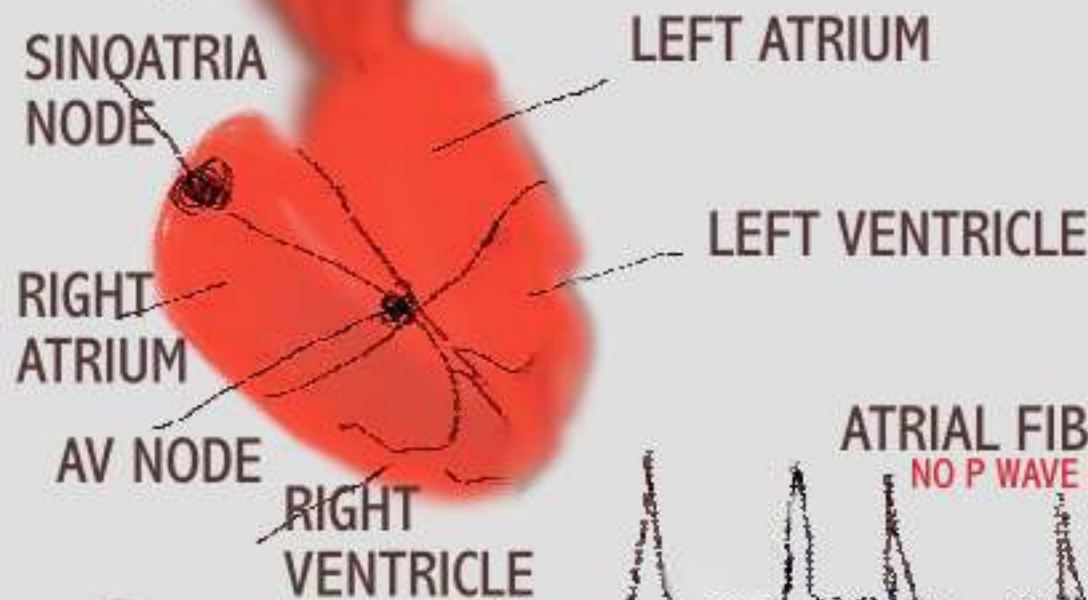
## PERMANENT PACER

PACEMAKER IMPLANTATION - A SMALL DEVICE CAN BE FELT UNDER THE SKIN.



# WHAT IS WRONG WITH THIS EKG?

WHEN THE SA(SINOATRIA ) NODE FIRES, THE ATRIA CONTRACT. WHEN THE AV ( ATRIOVENTICULAR) NODE FIRES, THE VENTRICLES CONTRACT.



**ATRIAL FIBRILLATION**  
NO P WAVE PRESENT

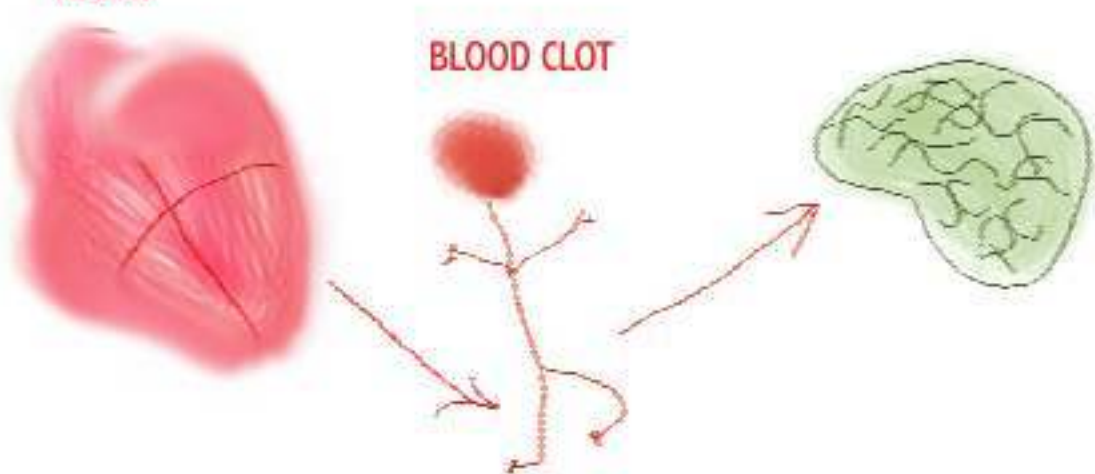


JIM HAS BEEN UNDER A LOT OF STRESS AT WORK. HE HAS BEEN HAVING CHEST PAINS OFF AND ON. THIS MORNING HE WOKE UP WITH MORE CHEST PAIN AND FEELING HIS HEART "RACING AWAY". HE DECIDES TO CALL HIS DOCTOR.

HEART

BLOOD CLOT

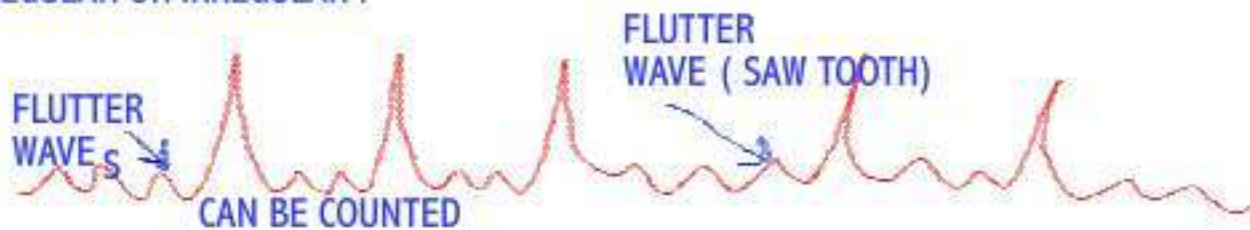
BRAIN



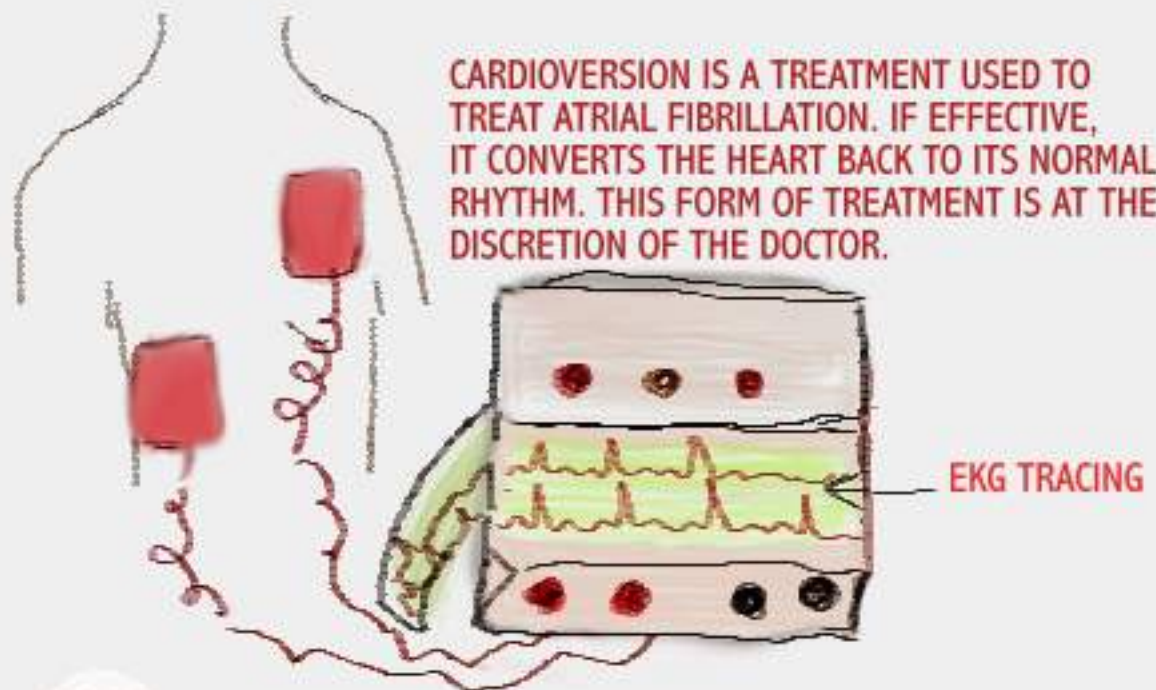
IN ATRIAL FIBRILLATION A BLOOD CLOT MAY FORM BECAUSE OF "QUIVERING" AND NOT EMPTYING OF THE ATRIA. A BLOOD CLOT MAY FORM AND TRAVEL TO THE BRAIN , THUS CAUSING A STROKE.

### ATRIAL FLUTTER

THIS RHYTHM IS LESS COMMON , BUT FOLLOWS A SIMILAR PATTERN TO A FIB. IT IS TREATED THE SAME AS A FIB. INSTEAD OF A COARSE WAVY LINE, THERE IS A DISTINCT FLUTTER WAVE , REFERRED TO AS "SAW TOOTH". THE RHYTHM MAY BE REGULAR OR IRREGULAR .



TREATMENT OF ATRIAL FIBRILLATION  
DONE IN A CRITICAL CARE SETTING  
WHERE CLOSE MONITORING CAN BE DONE.



CARDIOVERSION IS A TREATMENT USED TO TREAT ATRIAL FIBRILLATION. IF EFFECTIVE, IT CONVERTS THE HEART BACK TO ITS NORMAL RHYTHM. THIS FORM OF TREATMENT IS AT THE DISCRETION OF THE DOCTOR.



AMIODARONE INFUSION IS COMMONLY USED TO TREAT ATRIAL FIBRILLATION. HYPOTENSION IS A SIDE EFFECT OF THIS DRUG. TREATMENT USED WILL DEPEND ON THE DOCTOR TREATING THE ATRIAL FIBRILLATION.

# PVC (PREMATURE VENTRICULAR CONTRACTION)



THE VENTRICLE CONTRACTS PREMATURELY. THE QRS IS WIDER THAN NORMAL.

THE VENTRICLE MAY CONTRACT PREMATURELY WITH OR WITHOUT HEART DISEASE. ANXIETY OR STRESS IS A COMMON CAUSE OF THIS CONDITION. IT MAY NOT REQUIRE ANY TREATMENT IF NOT VERY FREQUENT. OTHER CAUSES INCLUDE , MYOCARDIAL INFARCTION , AMPHETAMINES, COCAINE, CAFFEINE AND OVER-EXHAUSTION.

TREATMENT WILL BE DIRECTED AT THE CAUSE. DRUGS SUCH AS BETA BLOCKERS - ATENOLOL AND TOPROL XL AND ANTI-ANXIETY DRUGS LIKE XANAX ARE USED.

Mrs.K has a very demanding boss. He cares little about the unreasonable demands he makes on her. The stress is causing her chest pain.

I need all of this paperwork completed today, even if you are late going home.



## WHAT CAUSES CHEST PAIN? (ANGINA PECTORIS)



When a patient complains of chest pain do we really understand what happens?

The heart is a pump about the size of a folded fist. The heart has a tremendous amount of work to do , supplying the entire body with "oxygen rich "blood, so the body can carry out its various functions.

When a blood vessel in the heart becomes blocked either by a blood clot which has migrated from another area or atherosclerosis ( fatty deposits) which build up and cause partial or complete obstruction in a blood vessel, ischemia or infarction may result.

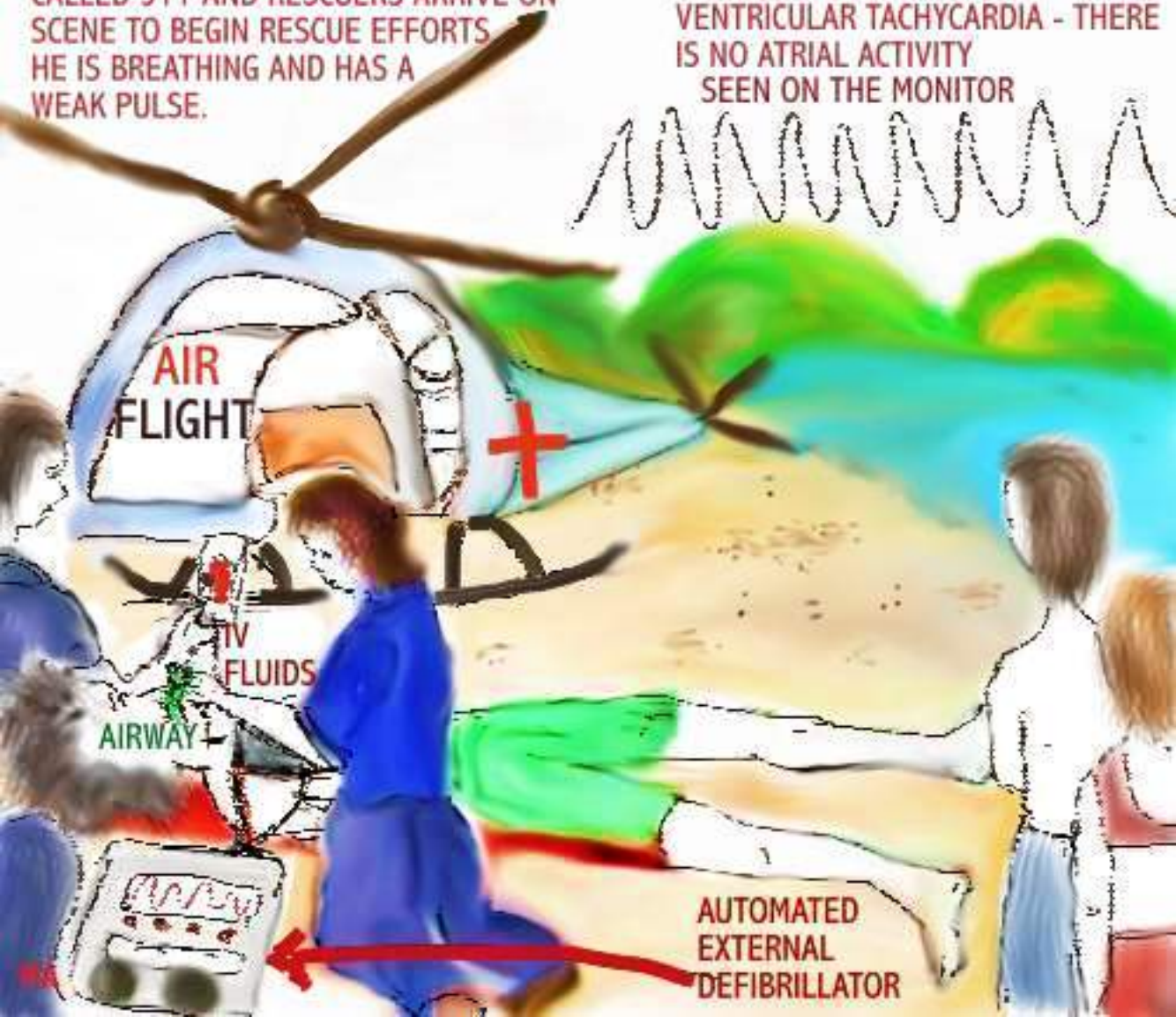
Chest pain (angina pectoris) typically occurs when there is an increase in unusual activity like carrying a very heavy load or strenuous exercise. Prinzmetal angina is a type of angina that occurs at rest. Nitroglycerin is usually ordered for angina. It is used in sprays, tabs and paste put on topically. The doctor will order as needed.

## WHAT IS WRONG WITH THIS EKG?

THIS YOUNG MAN, POSSIBLY IN HIS 30s, WAS FOUND NEAR THE LAKE. SOMEONE CALLED 911 AND RESCUERS ARRIVE ON SCENE TO BEGIN RESCUE EFFORTS. HE IS BREATHING AND HAS A WEAK PULSE.

CARDIAC MONITOR DISPLAYS:-

VENTRICULAR TACHYCARDIA - THERE IS NO ATRIAL ACTIVITY SEEN ON THE MONITOR



AIR FLIGHT



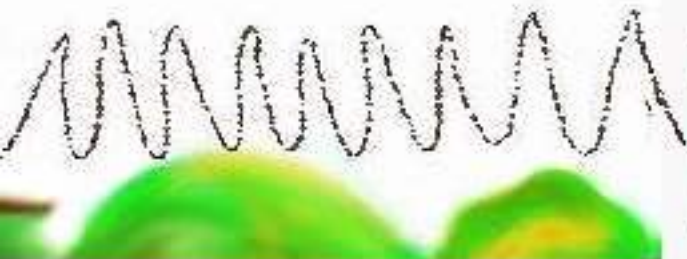
TV FLUIDS

AIRWAY

AUTOMATED EXTERNAL DEFIBRILLATOR

# WHAT IS WRONG WITH THIS EKG?

VENTRICULAR TACHYCARDIA - THERE IS NO ATRIAL ACTIVITY



VENTRICULAR TACHYCARDIA MAY BE SEEN IN PATIENTS WHO HAVE CORONARY ARTERY DISEASE, MYOCARDIAL INFARCTION (HEART ATTACK), ELECTROLYTE IMBALANCES, OR NO HISTORY OF HEART DISEASE.

ASSESSMENT OF V-TACH MAY OR MAY NOT REVEAL A PULSE. IF THERE IS NO PULSE, IT WILL BE TREATED THE SAME AS V-FIB. THIS WILL BE DISCUSSED IN A LATER CHAPTER.

SYMPTOMS INCLUDE:-

- CHEST PAIN, SHORTNESS OF BREATH
- DIZZINESS, DECREASED LEVEL OF CONSCIOUSNESS
- HYPOTENSION (LOW BLOOD PRESSURE)
- PALPITATIONS AND SIGNS OF SHOCK



WHEN THE SA NODE FIRES, THE P WAVE IS SEEN.

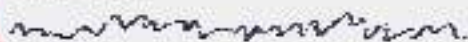
Q- WHAT IS VENTRICULAR TACHYCARDIA?

A - VENTRICULAR TACHYCARDIA IS AN ARRHYTHMIA THAT IS CONSIDERED TO BE LIFE-THREATENING AND IF LEFT UNTREATED MAY LEAD TO SUDDEN DEATH. IT IS RAPID AND TYPICALLY, THERE IS NO P WAVE ON THE EKG. THE ABSENCE OF THE P WAVE SIGNIFIES THE ABSENCE OF ATRIAL ACTIVITY.

TREATMENT INCLUDES :-

- CPR, O<sub>2</sub>, AIRWAY MANAGEMENT
- IV, CARIOVERSION
- TREATMENT OF THE ARRHYTHMIA WITH DRUGS SUCH AS AMIODARONE AND LIDOCAINE.
- MONITORING EKG AND PATIENT STATUS

VENTRICULAR FIBRILLATION - TO BE DISCUSSED IN A LATER CHAPTER



When an area of the heart muscle is ischemic or infarcted, that area is deprived of blood and oxygen. Infarction results in complete death of muscle, whereas ischemia results from a shortage of blood and oxygen and there is a chance of recovery for the muscle.

Fatty deposits in blood vessel

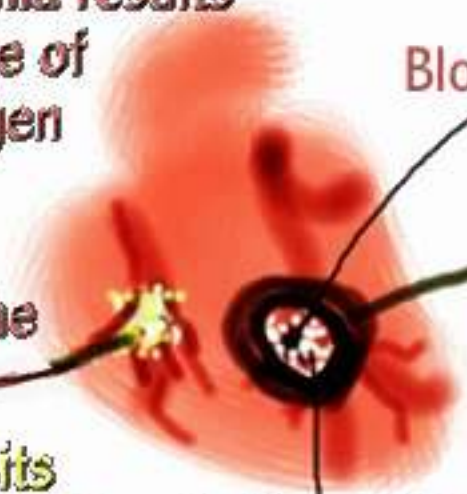
Area in the middle is ischemic. Ischemia does not result in complete death of muscle.

Blood clot obstructing blood vessel


Infarcted area caused by blood clot. Heart muscle dies.

Fatty deposits in blood vessel

Blood clot in blood vessel




What kind of patient education did this patient receive?

A cartoon illustration of a woman sitting up in a hospital bed. She is wearing a hospital gown and has a nasal cannula in her nose. To her left is an oxygen tank. A bedside table with a lamp and a clock is next to her. A speech bubble points to her.

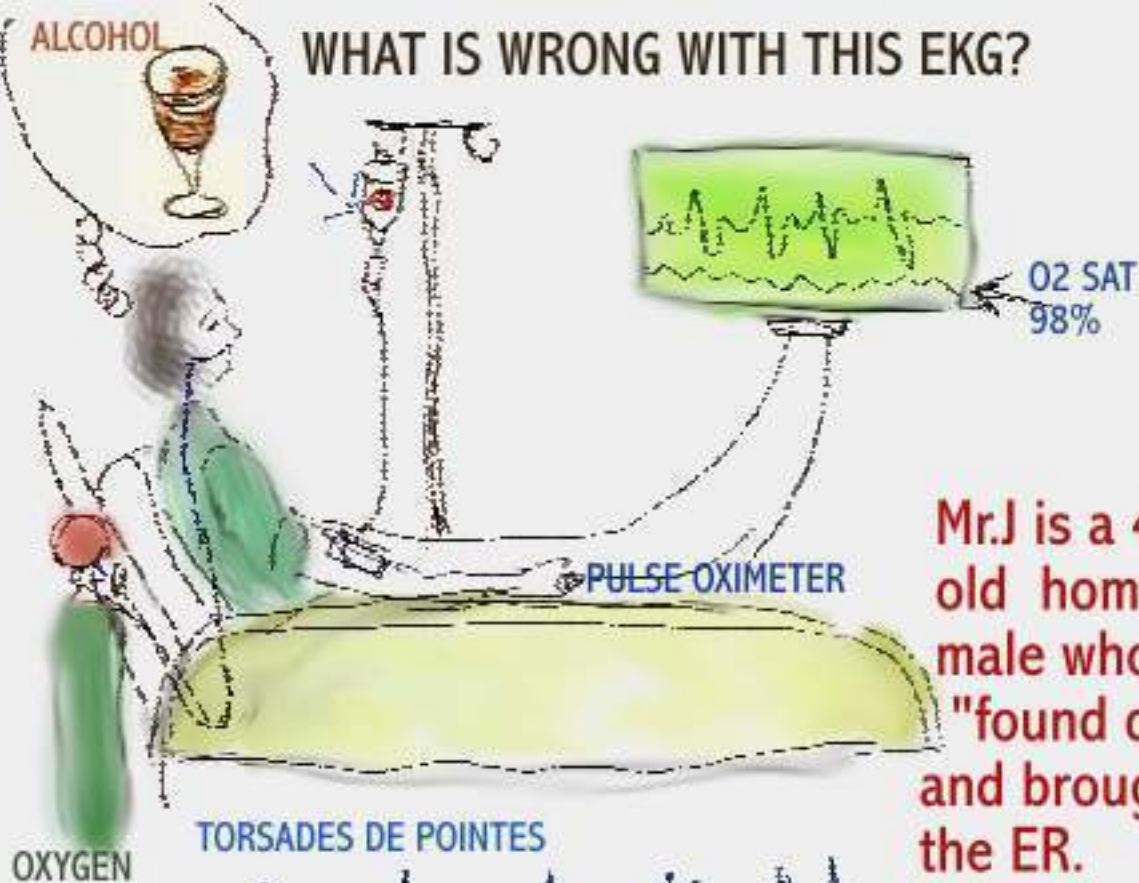
Honey, I need you to bring me my cigarettes. Since this chest pain started, I have not had a cigarette.

**ADVISE PATIENT  
OF THE  
DANGER OF  
SMOKING WITH  
OXYGEN  
RUNNING!**

An arrow pointing from the text to the nasal cannula.

oxygen flow via nasal cannula

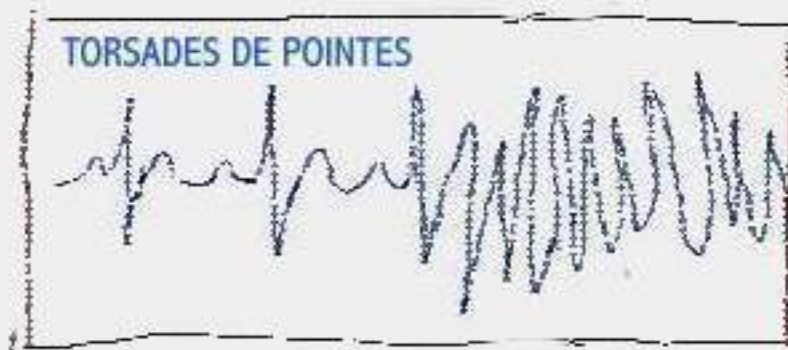
# WHAT IS WRONG WITH THIS EKG?



Mr.J is a 49 year old homeless, male who was "found down" and brought to the ER. Lab values were done. His blood alcohol level was = 0.12

Mr.J is more awake, his monitor was showing Normal Sinus Rhythm, but suddenly his rhythm changes to the above rhythm.

# WHAT IS WRONG WITH THIS EKG? TORSADES DE POINTES ( AN OVERVIEW)

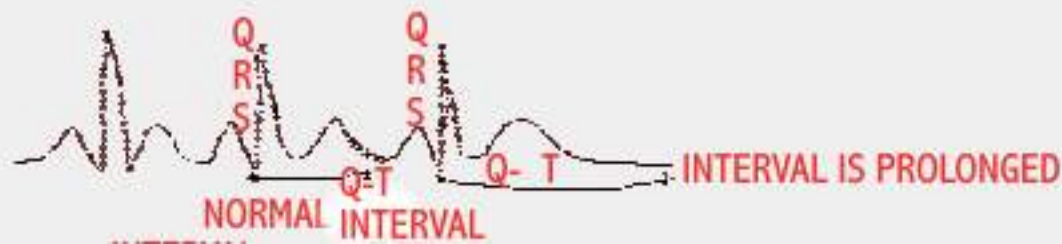


TORSADES DE POINTES IS COMMONLY FOUND IN PATIENTS WHO ARE ALCOHOLICS AND PATIENTS WHO ARE POORLY NOURISHED.

TORSADES DE POINTES ( TWISTING OF THE QRS AT THE BASE), IS A FORM OF VENTRICULAR TACHYCARDIA WHICH IS RARE. IT REQUIRES IMMEDIATE TREATMENT.

CAUSES INCLUDE HYPOMAGNESIUM, ANTIARRHYTHMIC DRUGS THAT MAY PROLONG THE Q-T INTERVAL, DAMAGE TO THE MYOCARDIUM AS A MYOCARDIAL INFARCTION. QUININDINE MAY CAUSE TORSADES DE POINTES.

SYMPTOMS:- DIZZINESS, CHEST PAIN, SHORTNESS OF BREATH, HYPOTENSION AND PALPITATIONS .



How is your day going Sally?

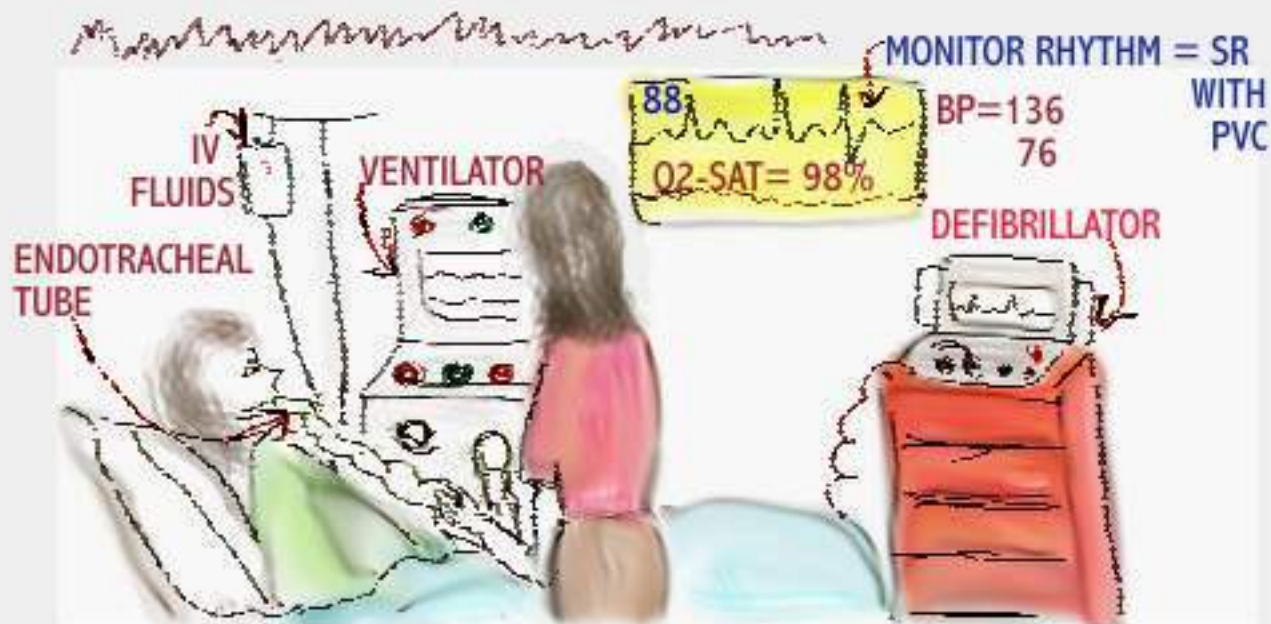
My patient was having chest pain when I left, so I told her to be calm and rest till I get back.



SALLY WAS DESPERATE TO TAKE HER BREAK. HER DECISION TO IGNORE CHEST PAIN WAS NOT WISE. HER PATIENT HAD A CARDIAC ARREST AND HAD A "CODE BLUE" CALLED. FINALLY, THE PATIENT WAS TRANSFERRED TO CCU WHERE HE WAS PLACED ON VENTILATORY SUPPORT AFTER HAVING ET-TUBE PLACEMENT.

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# VENTRICULAR FIBRILLATION



## VENTRICULAR FIBRILLATION

Q - What is Ventricular Fibrillation?

A -V-Fib is a lethal rhythm which requires immediate intervention. Above is a sample of V-Fib. There are no heart contractions and the ventricles are considered to be "quivering". V- Fib is commonly seen in cardiac arrest.

# VENTRICULAR FIBRILLATION

NO PULSE, NO HEART CONTRACTIONS



## VENTRICULAR FIBRILLATION

THE SKIN IS CLEANED PRIOR TO APPLICATION OF SALINE PADS.

**CAUSES** - include coronary artery disease, myocardial infarction, electric shock, coronary artery reperfusion and hypoxia.

**TREATMENT**- includes -CPR, SHOCK, IV, drugs such as Epinephrine, Vasopressin, Lidocaine, Amiodarone and Magnesium. Patients showing the above rhythm are usually unresponsive and pulseless.

# VENTRICULAR FIBRILLATION

## WHAT IS WRONG WITH THIS EKG?

*irregularly irregular*



Please tell me how your chest pain feels. Does it feel sharp, burning, squeezing or like pressure in the chest? Is there any radiation to the jaw, fingers or shoulder? Do you have any heartburn?

## HELPFUL HINTS

- NEVER ignore chest pain
- assess and document findings
- call for help if necessary
- give O<sub>2</sub> and check vital signs
- call MD for orders



**ACT  
FAST!**

**IF THERE IS CHEST PAIN  
ACT FAST!**



Chest pain may seem like pressure, or heaviness in the chest.



Chest pain may feel like an extra pair of hands squeezing the chest.



**ASK PATIENT TO  
DESCRIBE CHARACTER  
AND DURATION OF  
CHEST PAIN**



Chest pain may be severe and stabbing.

## PEA

Pulseless Electrical Activity - a condition in which there is electrical conduction from the heart, but the clinical picture is a patient who does not respond and requires CPR.



Causes include:  
hypovolemia, hypoxia,  
hypothermia, trauma,  
cardiac tamponade,  
drug overdose,  
thrombosis,  
tension  
pneumothorax and  
more.



Treatment of PEA is directed at following ACLS protocol and correcting the cause.



A common cause of PEA is hypovolemia.

# ASYSTOLE

NO ELECTRICAL ACTIVITY AND  
CARDIAC OUTPUT



WHAT IS WRONG WITH THIS EKG?

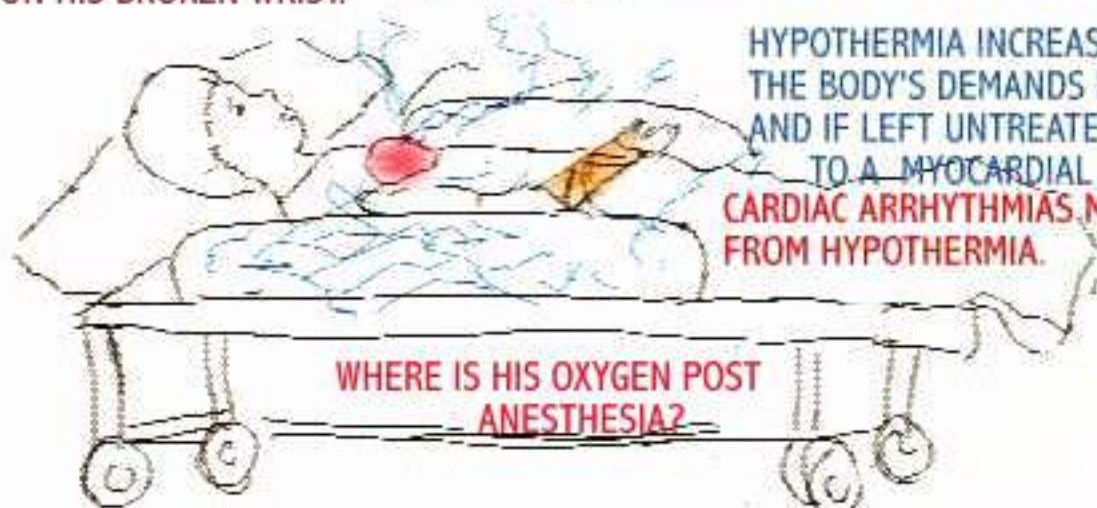
Q - WHAT IS ASYSTOLE?

A - ASYSTOLE MEANS THE HEART HAS COME TO A STANDSTILL AND THERE IS NO ELECTRICAL ACTIVITY OR CARDIAC OUTPUT. THE PATIENT IS IN FULL CARDIAC ARREST. IT REQUIRES EMERGENCY TREATMENT ( ACLS PROTOCOLS).

THIS PATIENT IS IN PACU  
AFTER HAVING SURGERY  
ON HIS BROKEN WRIST.



ASYSTOLE MAY RESULT FROM HYPOTHERMIA



HYPOTHERMIA INCREASES  
THE BODY'S DEMANDS FOR OXYGEN  
AND IF LEFT UNTREATED CAN LEAD  
TO A MYOCARDIAL INFARCTION.  
CARDIAC ARRHYTHMIAS MAY RESULT  
FROM HYPOTHERMIA.

WHERE IS HIS OXYGEN POST  
ANESTHESIA?

CAUSES - ASYSTOLE MAY BE CAUSED BY A MYOCARDIAL INFARCTION, V-FIB, HYPOTHERMIA, CARDIAC TAMPONADE, DROWNING, HYPOXIA OR ANY CONDITION THAT FINALLY RESULTS IN THE HEART STOPPING.

Mrs.O is tired of hearing alarms.No one has explained the need for keeping alarms on.



Nurse I called you because I need this alarm off.

Sorry, I cannot.

**ALARMS DRIVE ME CRAZY!**

Mrs.O has a visitor who decides to take the law into her own hands.



Mrs.O has a visitor who decides to take the law into her own hands.



**PATIENT EDUCATION - It is important to educate patients that ALARMS are set for their own safety. ALARMS SHOULD NEVER BE TURNED OFF BY PATIENT OR FAMILY!**

# DO NOT TURN THE CLINICAL SETTING INTO A VICIOUS CYCLE!

SAM WAS ADMITTED FOR ANGINA PECTORIS.



VISITORS ARRIVE .



HEY NURSE!

WHO DID THE ASSESSMENT AND PATIENT EDUCATION?



MORE VISITORS ARRIVE

SAM COMPLAINS OF SHARP PAIN IN THE CHEST.



SAM RECIEVES MORPHINE FOR PAIN



DO NOT GIVE THE  
HEART MORE  
WORK THAN THERE  
IS A NEED FOR!

A DAMAGED HEART  
NEEDS REST.  
LESS REST MEANS MORE DEMANDS FOR  
OXYGEN! THIS MAY RESULT IN MORE CHEST  
PAIN.