Australian Society of Dental Anesthesiology

December 2010

In This Issue

Federal Council Members

Presidents Message

This month the presidents message (with his permission) comes in the form of a reproduction of two letters sent by Dr. Mahoney.

The first is a letter to the delegates who attended the annual conference held in Noosa Heads this November. The Second is a response to the DBA's therapeutics committee on an enquiry to the society about penthrox.

Letter # 1

Thank you delegates for what we believe was a most constructive Annual Scientific and General Meeting. Your contributions were most valuable in determining future directions for the Society.
From the meeting a number of action items need to be followed up;
1. The ASDA executive will write to the DBA (again) outlining our concerns about the current regulations and in the consultative processes but in a constructive manner and it is our intention to encourage the Board to adopt the new ADA guidelines on conscious sedation as they will improve patient safety.
2. Furthermore ASDA will, through the ADA, will be contacting both ANZCA and th RACDS seeking the revision of PS9 as it will in all likelihood lower patient safety standards and restrict dentists' use of local anaesthetic

After consulting with the political strategists we will have to wait for a DBA's response, as they (DBA) could argue to the minister that they are responding. We need to have DBAs formal response.
If the response is unsatisfactory then:

3. ASDA will write to the minister to express our disappointment in the processes o determining the regulations and how these processes didn't follow AHPRA's regulations on how a board should conduct their business. Additionally, as an expert and representative body of dental conscious sedationists, we will be offering advice to the minister which will include current best practice guidelines

4. The delegates will be asked to write to the minister, local members and persons of political influence. This correspondence must have your personal touch yet we wi all have to be consistent in our concerns. To assist delegates, in the near future, the executive will soon be sending out a point form outline of those matters which need to be brought to the minister's attention. But we need to contact the ADA on their course of action in relation to the new ADA guidelines first.
5. In attempt to make Propofol more palatable to ANZCA for use in conscious sedation, ASDA will enter in to negotiations with manufacturers of Propofol to package the drug in smaller vials eg 25mg. This will clearly signal our intention to us the drug for conscious sedation and not for unconscious sedation.
6. Finally, the consensus from the meeting was that ASDA needs to expand its services to the dental profession through;
a. Formulating a Standard of Practice for Conscious Sedation in the Dental Surgery,

Links

The American Dental Society of Anesthesiology Links
http://www.adsahome.org

The Society for the Advancement of Anesthesia in Dentistry
http://www.asdahq.org

The American Society of Dental Anesthesiologists
http://www.asdahq.org

b. Accrediting practices for conscious sedation
c. Producing guidelines for Nitrous Oxide and Oxygen Sedation and Local Anaesthetic/Analgesia in collaboration with the ADA
d. Expanding courses offered by the Society to include Relative Analgesia, Dental Assisting for dental sedations and, Advanced Local Anesthesia and other topics relevant to the clinical practice of sedation such as a propofol review course, ECG interpretation to name a few.

My only concern at the moment is that there will be enough days in the week.
Regards
Greg

Gregory Mahoney
BDSc, PhD, (Qld) Grad Dip Clin Dent, MSc(Dent), (Syd).
President Australian Society of Dental Anaesthesiology

Letter # 2

Prof Michael McCullough
Chair, Dental therapeutics Committee
Australian Dental Association Inc.
14-16 Chandos St
St Leonards. 2065
NSW

RE: Use of Penthrox (Methoxyflurane) by Dentists

Dear Michael,
Thank you the opportunity to respond to the committee's deliberation on Penthrox usage by dentists. Essentially, the committee has asked 5 questions in relation to its usage.

1. Is the Australian Society of Dental Anaesthesiology (ASDA) aware of any studies that would support Penthrox use in the dental setting? There simply is no scientific evidence to warrant it use in the ambulatory dental setting; of the 5 supplied articles by MDI, none refer to the Penthrox Inhaler's use in the dental setting and the that supplied research is somewhat dated in that they are more than 30 years old. Furthermore, a Medline search found no supporting articles. The problem appears to be that once Methoxyflurane was found to be nephro and hepatotoxic in the mid -1970s all refereed scientific articles ceased.
2. Have there been any adverse outcomes that have occurred with its use? There are two parts to this answer; firstly ASDA is unaware of any reported adverse outcomes in relation to its recent usage in the dental surgery, anecdotally there have been reports of some patients losing consciousness and having low oxygen saturation levels but like a lot of things in dentistry it has never been officially recorded. This is not surprising given the level of knowledge of the dentists using Penthrox as they may be unaware of the seriousness of the unconscious patient. The dentists are not probably aware that incidences such as unconsciousness should be reported nor are they probably aware to whom they should report. Secondly, the major reason for Methoxyflurane's discontinued use has been the environmental hazard that prolonged exposure has on the staff administering the drug. Methoxyflurane has long since been ceased to be used for general anaesthesia due to a perceived nephrotoxic problem associated with its use. Again, and I stress anecdotal evidence, from surgeries that have used the Inhaler with the scavenging system has indicated that the surgeries reek of Methoxyflurane during the procedure and for some time after. The

safe level of Methoxyflurane is, I believe, 2 ppm and a surgery that reeks following the procedure suggests that the level may be more than this. It may be that users are incorrectly removing their fingers from the vent hole on the Inhaler but as the user becomes more sedated then this is likely. For some time now, Westmead Hospital's sedation unit has attempted to validate the safety of the Penthrox Inhaler in the dental setting but to date studies have been rejected on safety grounds.

3. Does ASDA feel that feel that further training by dentists is required to the use of this drug? Methoxyflurane is a volatile anaesthetic agent and even in the concentrations given through the inhaler has both analgesic and sedative actions, and as such this altered state of consciousness requires careful monitoring. The manufacturer states that this state of sedation may be no different from nitrous oxide and oxygen techniques, however there are important differences that the committee should be aware;
    - **a.** The mean alveoli concentration (MAC) of N_2O to induce a state of anaesthesia in 50% of all patients is 104 %.
    - **b.** Modern relative analgesia machines have a maximum concentration of deliverable N_2O of 70% with minimum flow levels.
    - **c.** The dose of N_2O is carefully titrated to effect.
    - **d.** The MAC of Methoxyflurane 0.2% and the dosage can vary depending on how hard and often the patient sucks on the inhaler.
    - **e.** Supplemental O_2 is usually not given, and indeed not available in many dental surgeries.
    - **f.** Therefore, the margin of safety for Methoxyflurane is much smaller than for N_2O.

    For these reasons, ASDA believes that, if the environmental safety of the Penthrox inhaler could be demonstrated, then the administrating dentist would have to be skilled in dealing with the sedated and unconscious patient as well as any medical emergency arising from its use such as airway obstruction.

    Further to this, there should be a requirement for the dental surgery's using Methoxyflurane to have the necessary equipment to deal with emergencies such required for any procedural sedation under the ADA guidelines.
4. Is ASDA aware of any current training that would be adequate to support its use? There are courses specifically held for dentists who perform sedation. Both ASDA and the Centre for Resuscitation and Emergency Simulation Training (CREST) at Westmead Hospital, NSW, run courses throughout the year. But these courses are designed as the yearly refresher course for dentists who perform sedations. The courses assume certain knowledge and would not be comprehensive enough to train or test a dentist to the required level of competency. It is ASDA's opinion that the only course available to dentists, at present, is the Graduate Diploma in Clinical Dentistry (Conscious sedation and pain Control).
5. Does ASDA support the use of Penthrox in the dental surgery? The simply answer is that ASDA cannot support the use of the Penthrox Inhaler in the dental surgery unless the issues of safety to both the patient and staff has

be adequately addressed by validated peer reviewed articles as well the level of training and equipment that would be required.

There is no doubt that Methoxyflurane can provide effective analgesic and sedative states for the anxious patient, yet its safety in the dental operatory has not been demonstrated. Often the users of Methoxyflurane point to its safe use in ambulance services throughout Australia, however it should be pointed out that there are significant differences between its use in the ambulance service in the dental surgery outpatient setting.

- Patients transported by the ambulance service are going to a hospital with all its staff and facilities.
- Ambulance officers are highly trained in the monitoring and treatment of the sedated patient (more so than the general dentist).
- There is specialized equipment in the ambulance to assist and,
- There are limitations placed on the use Methoxyflurane in the back of the ambulance due to the environmental hazard concerns to the ambulance officers.

Once again, ASDA thanks the committee for the opportunity to comment on the Penthrox Inhaler's use in the dental surgery and is happy to assist in any way in the future.

Yours sincerely,

Greg Mahoney
BDSc, PhD, GradDipClinDent, MSc(Dent)
ASDA President

Treasurers Report

Treasurers Report 2010

I am pleased to report that our Society remains in the black, although our profit for the year was only $5390, as compared with $17716 the previous year. This was because of the impact that the IFDAS conference had on our funds. Managed funds are down to about 13K due to drawings to cover IFDAS.

Income from annual subs went up from 12K to nearly 20K and our running costs are much the same as previous years. This is my first year as treasurer and I am beginning to realise the huge effort that past-treasurer James Auld put in - it is not an easy position and demands quite a lot of thought and work!

IFDAS:

A total contribution to IFDAS of $85000 was made by our Society - whilst this meeting was a great success, it does have the ability to cripple a small society like ours and I think that great care should be exercised in the future (by the IFDAS executive) when awarding the meeting to smaller societies.

As a result of negotiations by Greg Mahoney with the Conference organisers (Carillon) and because of their flexibility and desire help us cope with unexpectedly poor numbers and the GFC, we ended up getting a return from Carillon of 29K. In a nutshell, Carillon saved our bacon!! I believe that we owe Greg and Corilian a large vote of thanks for their efforts in saving the day and that we should write to Carillon and express our thanks and gratitude for their management.

MEMBERSHIP

We have a total of 68 current, paid up members - we are now a small society. I believe that this is not a problem as long as we remain well structured - a strong Council and loyal members with good ADA support and interaction - this is pivotal to our survival. In my humble opinion, all Dip Clin Dent students should be given some sort of incentive to join ASDA and then be strongly encouraged to continue membership and take on leadership roles. They should be made thoroughly aware of the importance of ASDA for their on-going privilege to provide sedation services.

THE ANNUAL SCIENTIFIC MEETING

The lead up to this year's meeting has been a disaster - in previous years we have used a conference organiser, which has taken the load off the Executive and made for a well organised meeting, both with regards numbers attending the various courses as well as hotel bookings. Friday's Emergency Scenarios

program was totally oversubscribed and several members had to be turned away. We pre-booked hotel accommodation with the Sheraton and although we were only 8 rooms short of our commitment, members booked through a number a different portals with the result that ASDA may have to wear a penalty of $10000.00 for "unused" rooms. Another classic example that dentists should stick to dentistry and conference organisers should run conferences!!

In future, Carillon will run our programs and our subs will increase to cover their very reasonable costs.

CREST

Soon after I took over as treasurer I was ask to manage the not-insignificant-funds that CREST was generating. There was no formal arrangement between CREST and ASDA and it very soon became apparent that this relationship was flawed - was ASDA meant to bank the funds and pay expenses on demand or was there to be some accountability of the funds? What about public liability insurance, maintenance of the equipment, insurance of equipment, provision for the replacement of equipment, and so on? Who made decisions on the size of honorariums to be paid, and so on. In the end it all became too hard and there was nothing in it for ASDA and so a payment of 26.5K was made to CREST and we are out of the loop. Hopefully CREST has put some management strategies in place with accountability for income and expenses.

Our society will continue to provide continuing educational courses and advanced CPR management programs in tandem with those provided by CREST.

THE FUTURE

We are a society dedicated to pain and anxiety management in the dental setting. On that basis, we cannot lose! We have millions of fearful patients on OUR side! Regulations requiring a Grad Dip Clin Dent to practice sedation will see our

numbers grow slowly. Attempts by the dental board of Australia to over-regulate us my slow our growth, but the future of sedation in dentistry is assured! We must, however, continue to actively protect the right of our patients to receive pain-free dentistry, and this will probably require us to become politically more active.

Andre Viljoen

Treasurer

From The Editors Desk

Dear ASDA members as I sat through a very interesting and informative meeting in Noosa several things struck me.

-Firstly we as a group have a wealth of talent and experience in the field of procedural sedation.

-Secondly we have a group of doctors that are very keen on advancing their clinical skills through continuing education.

-Finally we (ASDA) have a duty to take up a larger role in providing this continuing education.

To this end I will continue the CE portion of these newsletters with an emphasis on topics that are practical in nature. Starting with this issue we will revisit monitoring starting with ECG interpretation.

As I have stated previously any contributions to the CE portion of the newsletter would be greatly appreciated.

Dr. Matthew Hunter and I have been collaborating on a new look for the newsletter and are debuting it in this issue. In addition to the web version we will include a printer friendly version for those who want hard copy of this or any subsequent issues.

Any feedback from the membership on the newsletter is welcome as we wish to continually improve the product.

I would to take this opportunity to publicly thank Dr. Mathew Hunter for his tireless and selfless efforts in helping me with the newsletter. Without his help and technical expertise non of this would be possible.

Jeffrey Field

Editor

Continuing Education Supplement

Questions

The topic for this and the next few newsletters will be a review of ECG interpretation.

1)A normal ECG is made of 3 wave forms. Name the 3 wave forms?

2)What does each of the three waves represent within the cardiac cycle?

3)What does the term isoelectric refer to and what is its significance?

4)Describe normal sinus rhythm?

5) Describe how one would work out rate on an ECG strip and define normal heart rate, tachycardia, bradycardia?

6)Describe the three forms of ventricular fibrillation and their significance?

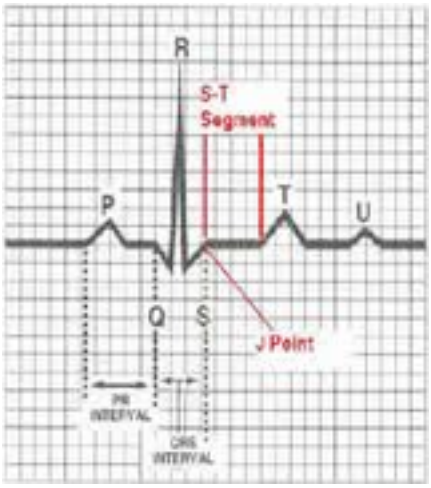
7)Discuss and classify heart blocks and their significance?

The Answers

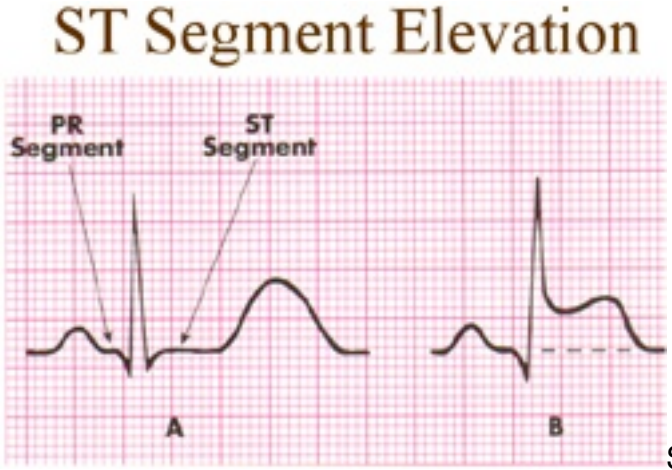
1)The 3 waves that make up a normal ECG are the
-P-wave
-QRS-wave/complex
-T- wave

2)The P-wave represents atrial contraction.
The QRS-wave/complex represents ventricular contraction.
The T-wave represents repolarization.

3)When one looks at an ECG strip there is a horizontal baseline set by the line joining the P-wave to the start of the Q-wave. From this line the ST segment is evaluated.If the the ST segment is at the same horizontal level as the P-Q interval the ST segment is deemed to be isoelectric. The end of the QRS complex or the beginning of the ST segment is called the J-Point.

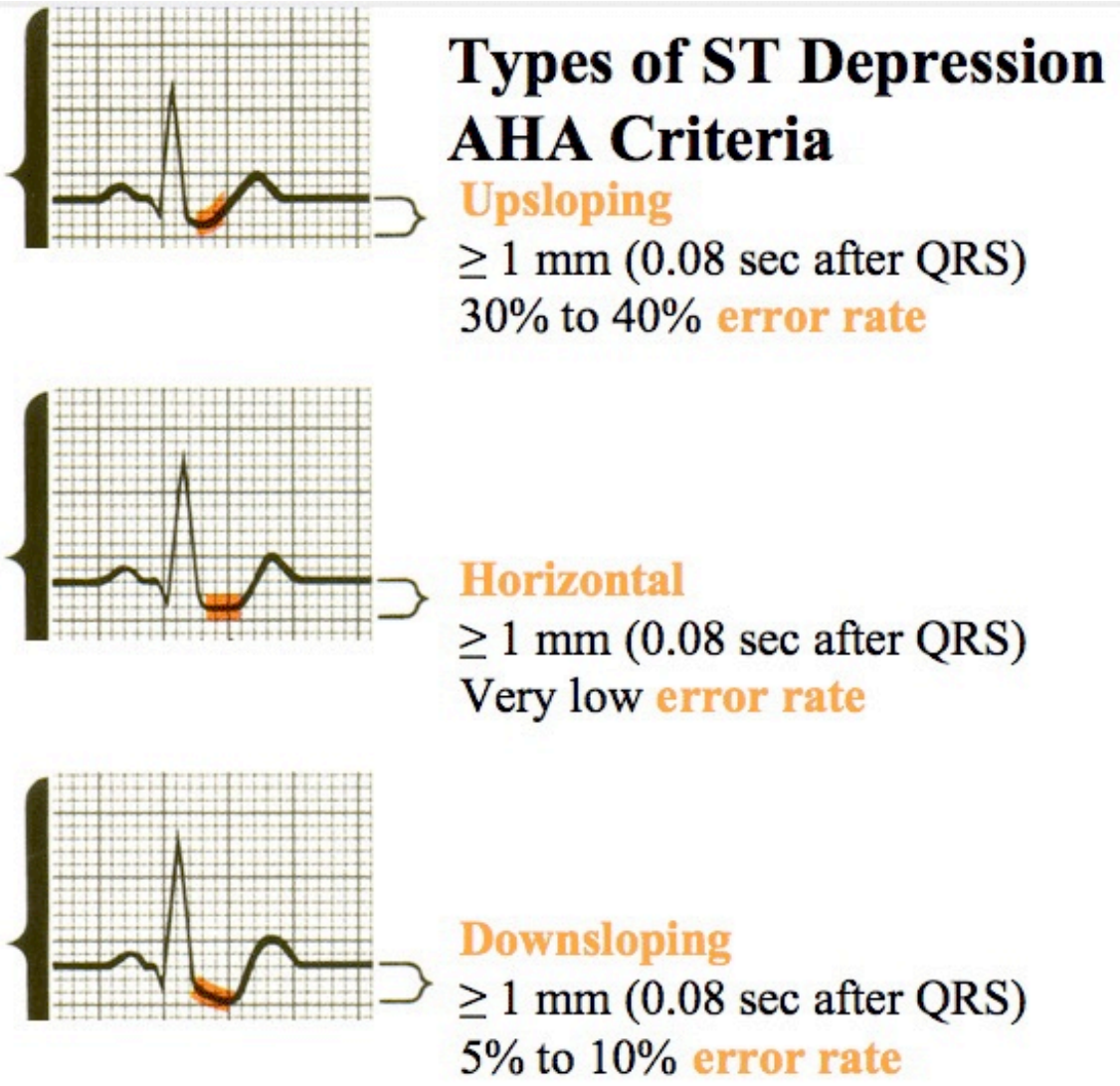


If however the ST segment(J-Point) is above the P-Q segment you then have ST elevation. Note image A is isoelectric while image B shows ST elevation.



ST elevation is indicative of a myocardial infarction(myocardial cell death)

If the ST segment(J-Point) is below the P-Q segment you then have ST depression.



There are 3 types of ST Depression as illustrated above. Downsloping and horizontal patterns are almost always associated with ischemia whereas upsloping is not ischemia in up to 40% of the cases.

ST depression is indicative of myocardial ischemia(myocardial oxygen deficit). Ongoing untreated ischemia can lead to infarction.

4) Normal sinus rhythm is described/defined as follows.

-the rhythm is regular at a rate between 60-100 beats per minute
-each QRS complex is preceded by an p-wave.
-each p wave is upright
-Each QRS is followed by an upright T-wave.
-the J point is isoelectric (see previous discussion)

NORMAL SINUS RYTHYM

NORMAL SINUS RYTHYM

5) Heart rates are classified into normal, fast(tachycardia) , slow (bradycardia).

-Normal rates are between 60-100 beats per minute.
-Fast rates (tachycardias) are rates over 100 beats per minute.
-Slow rates (bradycardia's) are rates below 60 beats per minute.

There are 2 methods used to count/determine heart rate on an ECG rhythm strip.

Since the ECG paper moves at 25 mm/second then we can conclude that 25 of the 1.0 mm boxes9 small boxes) will pass in one second.Therefore each 1.0 mm box equals 0.04 seconds.
There are 5, 1.0mm boxes in every large box so that every large box represents 0.2 seconds .

Now you have all the information you need to calculate rates

a) In the first method is simply to count the number of R-waves in one minute. However this is a bit tedious.

b) the next method involves memorizing the chart below.

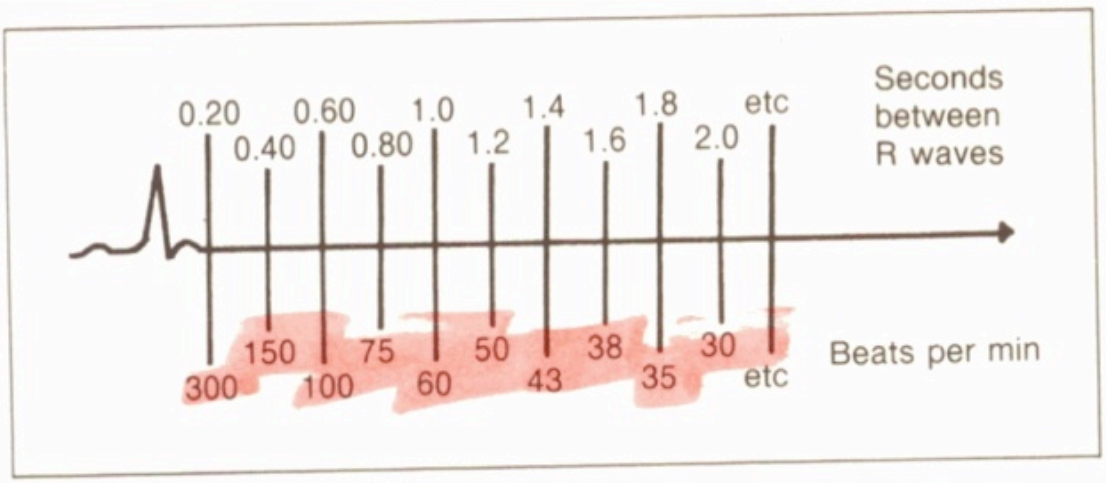
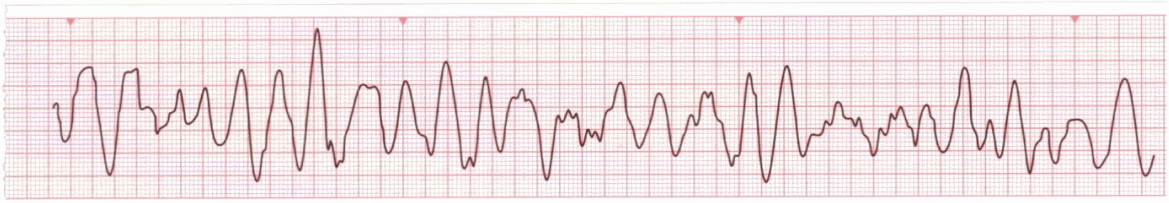


Fig 2-2 Rates associated with the number of large (5-mm) squares occurring between R waves. This should be memorized for a rapid means of evaluating rate.

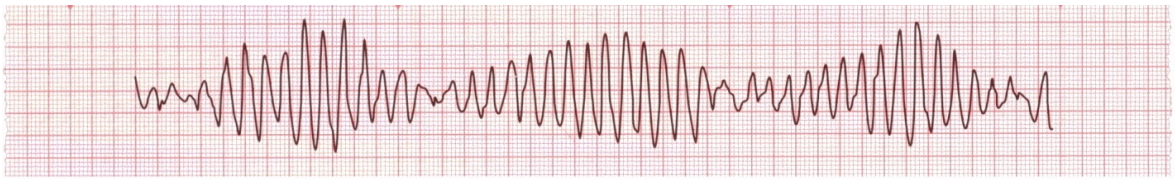
6) The three forms of ventricular fibrillation are corse , fine and torsades de points

a) Corse Ventricular Fibrillation



b) Fine Ventricular Fibrillation

c) Torsades De Points (french for twisting points). In this form of ventricular fibrillation you see fine v-fib becoming course v-fib and the revertiong to fine v-fib in a repeating cyclical pattern.



The immediate significance of all 3 forms of ventricular fibrillation is that the ventricles are fibrillating/quivering and therefore not contracting in any co-ordinated fashion and a a result **NOT PUMPING ANY BLOOD.**

The treatment (see ACLS/ALS guidelines) for all 3 forms is similar with one notable exception. Torsades De Points is indicative of low magnesium and often will not respond to defibrillation until 1-2 grams of magnesium are given.
Another issue of clinical relevance is that corse v-fib more easily converts than fine vifib when the heart is defibrillated. Epinephrine can in some patients change fine v-fib to corse v-fib thus increasing your chances of successful defibrillation.

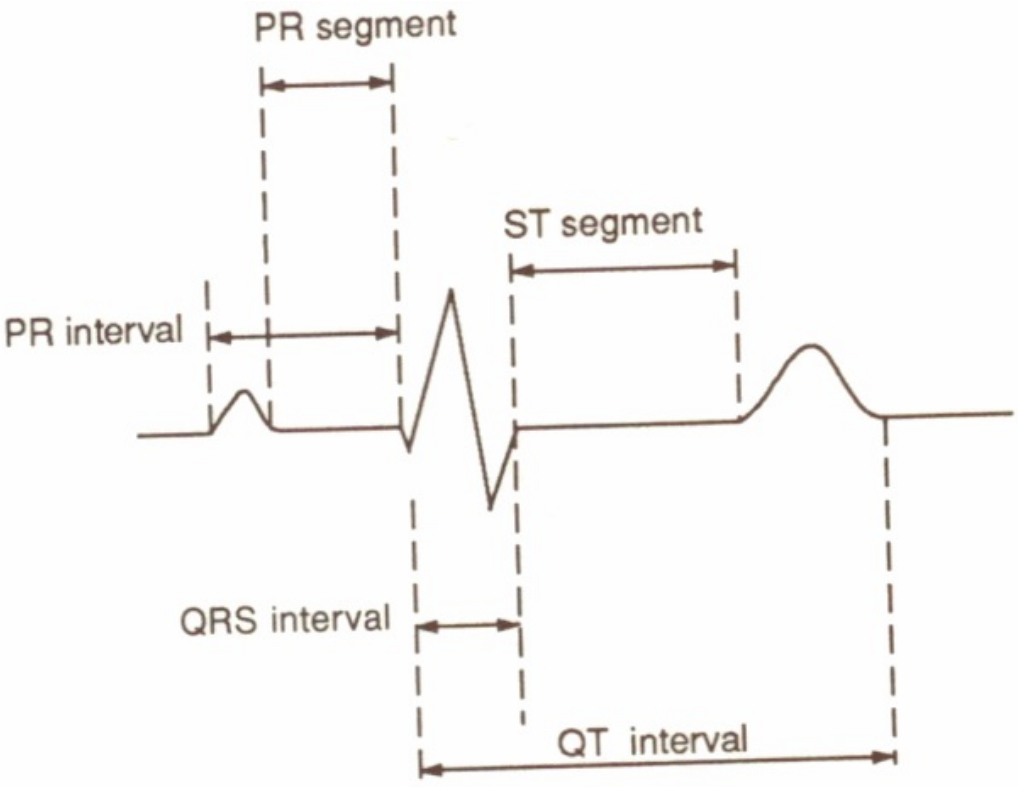
7) In order to discuss heart blocks one must first look at what the normal cardiac intervals are. In particular one must look at the P-R interval. Remembering that each small box (from left to right) represents 0.04 seconds and each large box represents 0.20 seconds)

The normal cardiac intervals are as follows;

-PR interval (measured from the beginning of the P-wave to the beginning of the Q-wave) is 0.12-0.20 seconds or 3-5 small boxes

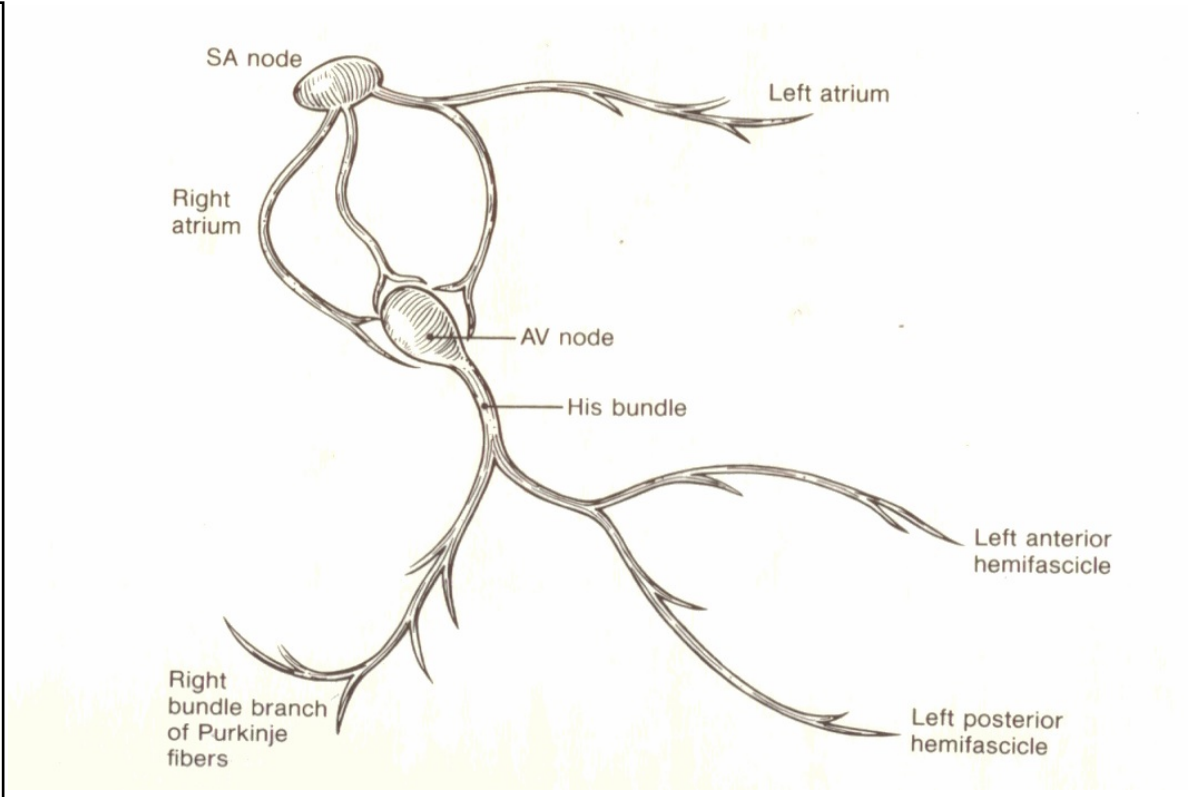
-QRS interval (measured from the beginning of the Q-wave to the end os the S-wave or J-point) is below is below 1.0 seconds or below 3 small boxes

-The Q-T interval (measured from the beginning of the Q-wave to the beginning of the T-wave) should be around 0.425 seconds or 10 small boxes or 2 large boxes.

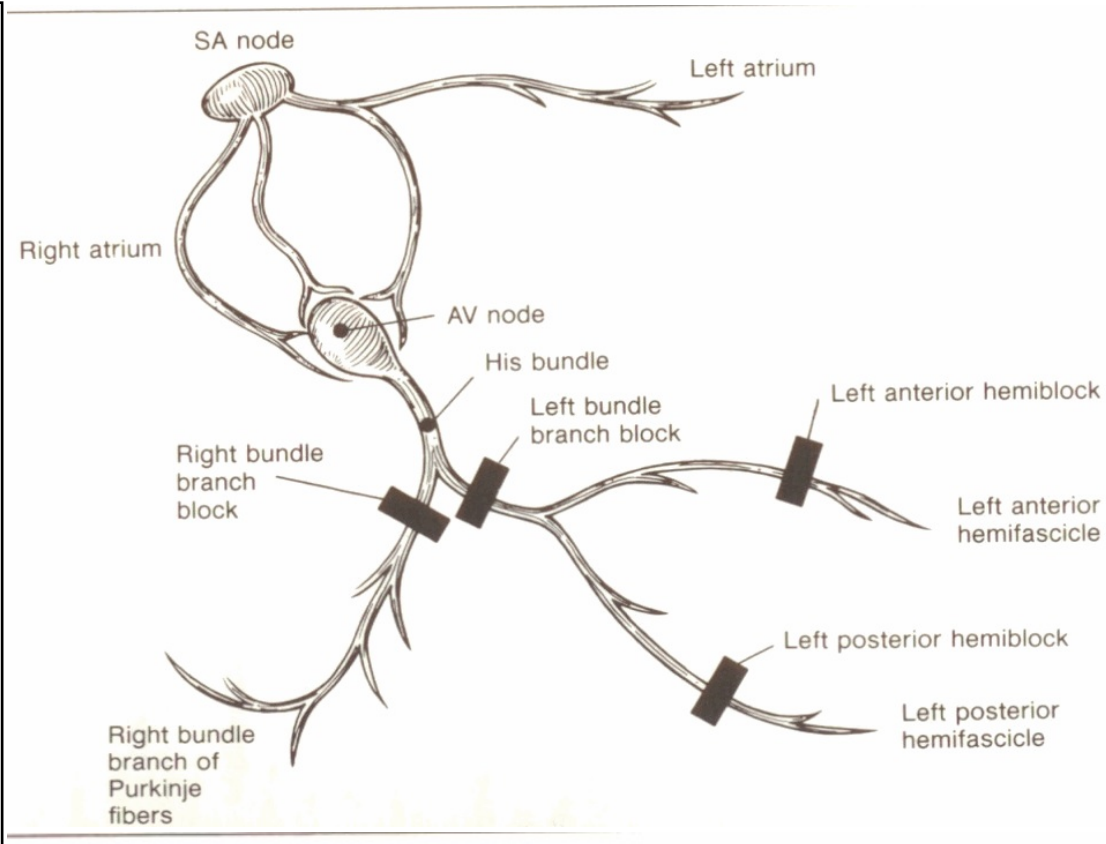


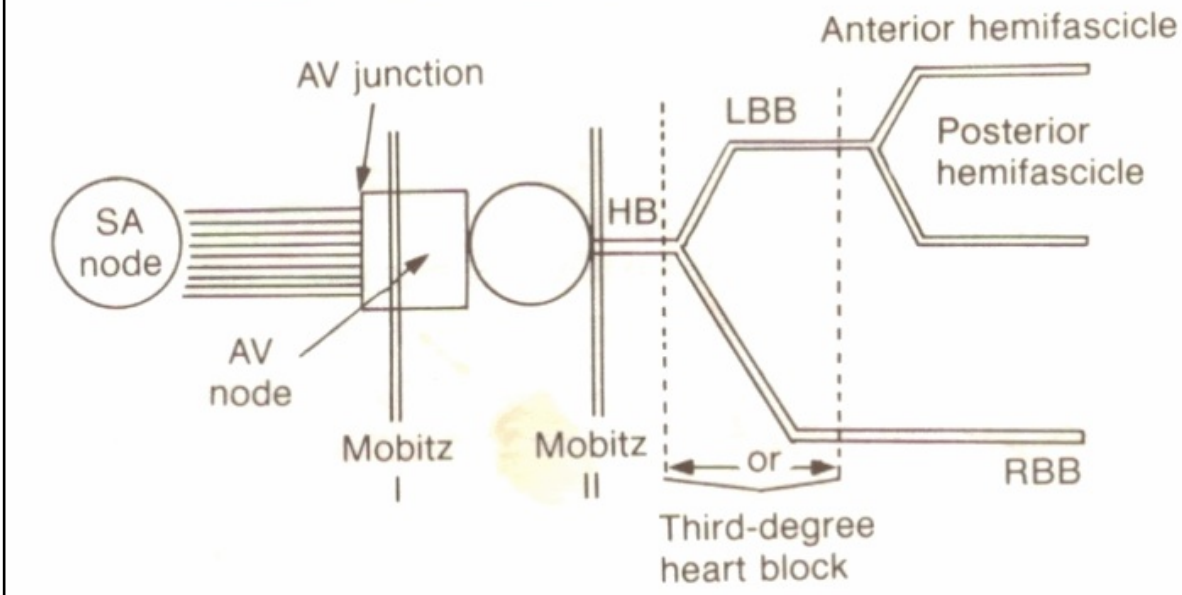
Now back to the question “describe heart blocks”.
Heart blocks are the result of a break or interruption in the normal conduction pathway.

As a review in a healthy heart impulses originate in the sinoatrial node in the right atrium and travel to the left atrium , right and left ventricles causing coordinated contraction of the heart muscle in a stepwise fashion from the atria to the ventricles and from the right heart to the left heart. The impulse go, or are carried by what is known as the normal conduction pathway. As seen below this runs from the SA (sinoatrial)node through the right and left atrium to the AV (Atrioventricular)node to the HIS bundle and then to the purkingie fibers in the right ventricle and the anterior and posterior hemifascicles in the left ventricle.



Any interruptions to this normal pathway will cause heart blocks.





Heart blocks are classified as follows:

a) First degree heart block occurs above the AV node. This is recognized on an ECG by a long P-R interval (over 2.0 seconds) with NO dropped beats

b) Second degree heart block is sub classified as type 1 or mobitz one and type 2 or mobitz two.

-mobitz one/type 1 occurs within the AV node. This is recognized on an ECG but a progressive prolongation of the P-R interval prior to a dropped beat.

-mobitz two/ type 2 occurs below the AV node in the HIS bundle. This is recognized on an ECG by a fixed prolonged P-R interval with regularly dropped beats

c) Third degree heart block can occur in the HIS bundle or below at the level of the right and left bundle branches. This is recognized by the fact that there is NO ASSOCIATION between the P-waves and the QRS complexes. P-waves occur at regular intervals as do QRS complexes but the P-waves are not generating the QRS complexes. The QRS complexes are wide (over 0.1 seconds) because

they are generated by pacemaker cells below the AV node. It is described as the the P-waves marching through the QRS complexes.

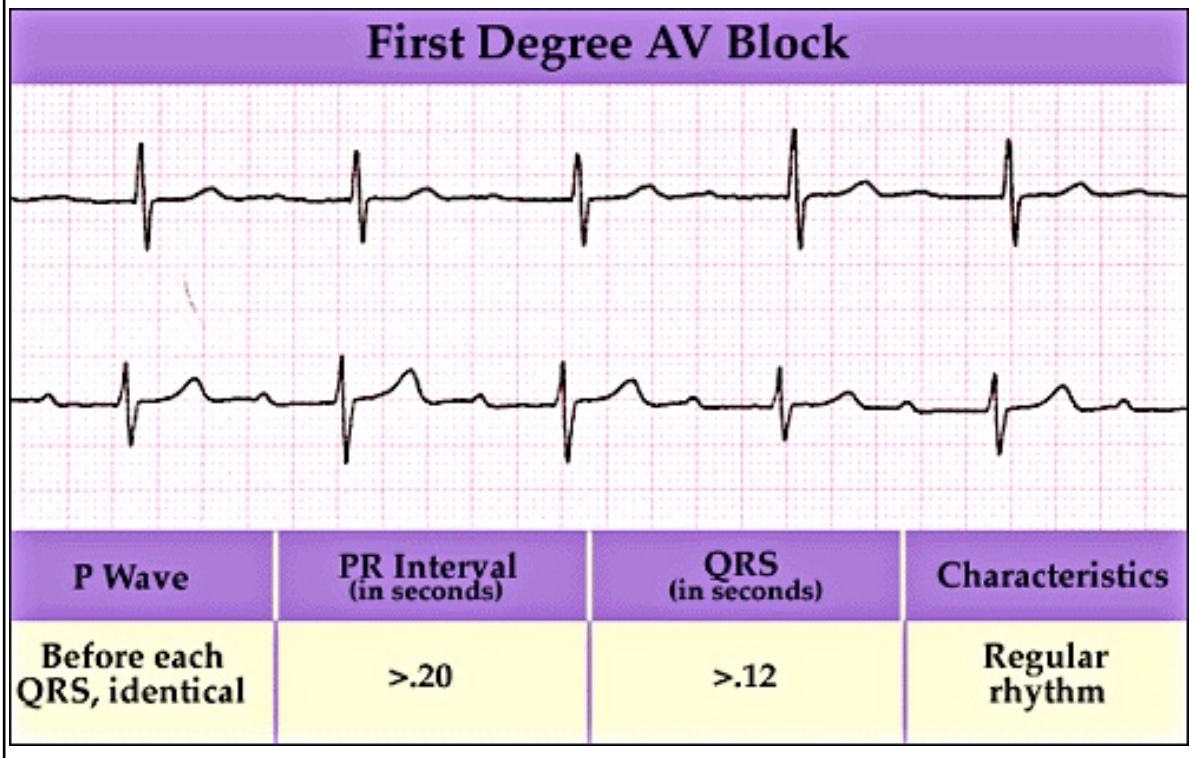
The clinical signifigance of heart blocks are:

-First degree has not a lot of significance and is not overly worrisome from a clinical viewpoint.
-Similarly second degree heart block /type 1 has not a lot of significance and is not overly worrisome from a clinical viewpoint.
Neither of these two tend to deteriorate into other arrhythmia's with serious clinical consequences

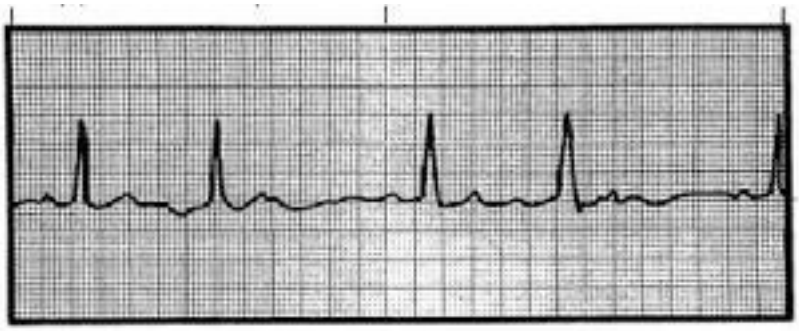
-Second degree heart block type 2 is of major concern as it often deteriorates into third degree heart block
-In third degree heart block you are relying on a ventricular pacemaker site which at best can deliver a rate of 40 beats per minute. This in most individuals will not maintain adequate perfusion to vital organs.

Now let us look at the various forms or heart block.

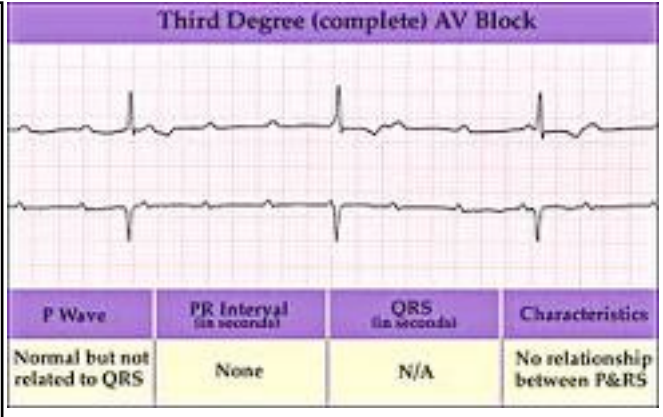
FIRST DEGREE BLOCK



SECOND DEGREE AV BLOCK TYPE 1



SECOND DEGREE AV BLOCK TYPE 2



THIRD DEGREE AV BLOCK

In the next newsletters we will continue our discussion of ECG interpretation looking in detail at:

- ECG anatomy and cardiac intervals
- a detailed look at regular vs irregular rhythms
- a detailed look at the QRS complexes, it' abnormalities and their signifigance
-asystole and how to recognize its different forms
- tachycardia recognition , and signifigance
- PEA ,recognition, causes
- a detailed look at p-wave abnormalities and their signifigance
- determination of internal cardiac pacemaker sites
- pre-excitation syndrome basics
- Basic 12 lead ECG interpretation and laboratory work used in an MI workup.
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