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Lab 10- Electrocardiography
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Purpose

The purpose of this lab experiment was to show us how cardiac muscle cells, which are the sources of electrical activity of the heart, are graphically recorded, measuring the actual activity of the heart through electrocardiography. By doing this activity, we also learned the major components of an EKG, and what happens to the atria and ventricles of the heart as it contracts.

Procedures

10-A: Recording the EKG – Lead II

1. To get things started:

- Before you turn anything on, be sure the IWX/214 unit is plugged in, and that the IWX/214 unit is connected to the laptop by USB cable.

- Be sure that the C-AAMI-504 EEG cable is inserted into the isolated inputs of Channels 1 and 2 of the IWX/214. Be sure that the three color-coded lead wires are correctlyinsertedintheleadpedestaloftheC-AAMI-504EEGcable. Insert the connectors on the red, black, and green electrode lead wires into the color-coded matching sockets on the lead pedestal of the ECG cable. The white and brown lead wires can be removed and neatly placed in the Iworx case, you do not need them for Lab 10, but after the week is over they will need to be replaced.

- Once everything is connected, FIRST turn on the laptop and allow it to fully boot up before you turn on the IWX/214 unit. Once the Iworx unit is on, the red indicator light on the Iworx unit should light up and you may hear the USB chime from the laptop if the laptop does not default to mute (many are set to default to mute).

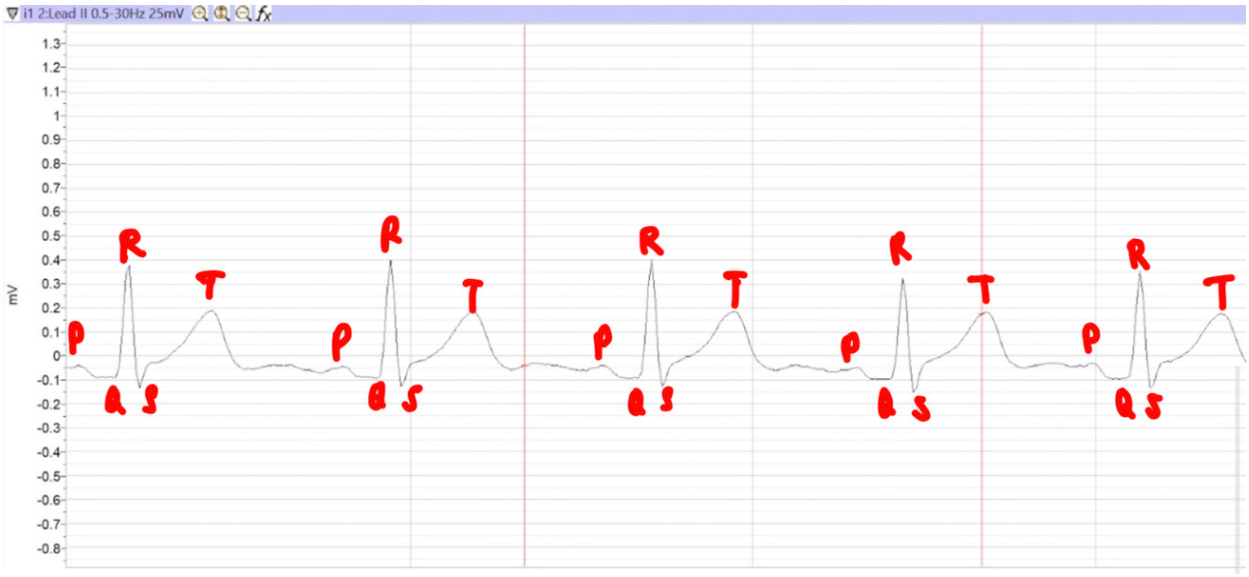
2. Open the Labscribe3 program by clicking on the Labscribe3 icon on the desktop. As soon as the program opens, you should see a window pop-up that says “Hardware found IWX214:2008-1-24,” click “OK.”
3. In the second from the top row (the row that says “File Edit View Tools Settings Advanced External Devices Help”), click on the “Settings” tab. About one third of the way down the drop-down window should be a tab called “Human Heart.” Click on that tab and that should lead you to a tab called “ECG-HeartSounds.”

4. Since Lab 10 is about ECG only, we can hide the lower “Heart Sounds” row by clicking on the σ symbol to the left of the row label, then clicking on the “Hide” tab, and then “Yes”.

5. Remove the disposable ECG electrodes from its envelope and snap the lead wires onto the electrodes while the electrodes are still on the plastic shield. Instruct the subject to remove all jewelry from their wrists and ankles. Use an alcohol swab to clean a region of skin on the subject's right wrist, and the inside of both ankles. Let the area dry.
6. Apply the black (-1) electrode to the scrubbed area on the right wrist. Repeat Steps 5 and 6 for the inside of the left ankle and the inside of the right ankle, so that the following Lead II is arranged:
    - the black (-1) lead is attached to the right wrist,
    - the red (+1) lead is connected to the left ankle,
    - the green (C or ground) lead is connected to the right ankle.
7. Instruct the subject to sit quietly with their hands in their lap. If the subject moves, the ECG trace will move off the top or bottom of the screen. If the subject moves any muscles in the arms or upper body, electromyograms (EMGs) from the muscles will appear on the ECG recording as noise.
8. Click on the Record button, located on the upper right side of the LabScribe Main window. The signal should begin scrolling across the screen. If the ECG appears upside down in Lead II (upside down P, R and T waves), click on the upside down triangle on the far left of "σA1:ECG 0.3-35Hz," then click on the first option "Invert." This should correct the image of your Lead II ECG to be "right side up," but do this ONLY ONCE.
9. When you have a suitable trace, type <Subject's Name> Lead II in the Mark box to the right of the Mark button. Press the Enter key on the keyboard after the recording has started to attach the comment to the data.
10. Click on the AutoScale tab at the upper margin of the ECG channel (look for the row that says on the left "σA1:ECG 0.3-35Hz" the AutoScale tab is the second icon after "Hz," it looks like a magnifying glass with a 2 symbol on it). Your recording should look like the figure in step #4. If the ECG waves appear too compressed (too close together), consider clicking the tab above the "Mark" tab that looks like a snow-capped pyramid. When the mouse is on top of this tab, it will say "Half Display Time." Clicking this tab will spread out your ECG patterns for step 11. If you overdo that last step, reverse it by clicking on the tab that looks like double pyramids ("Double Display Time") just to the right of the Half Display Time tab.
11. Record for approximately one minute and then click Stop to halt recording. Label one set of the five ECG waves (P, Q, R, S andT). Notice that every cycle is similar but not identical, and the distances between the QRS complexes may alter slightly.

Results

10-A: Recording the EKG – Lead II



Discussion

I think this activity has been the easiest to complete so far, well not the easiest but least confusing. I think that is why I'm starting with this lab report and not any of the other 6 I still have to do. I hate excel.
I actually liked learning about EKG's, and I felt like a professional because I actually understood what was going on, and why the graphs looked the way they did.
Surprisingly the electrodes didn't pull my hair off.
I googled a picture of Einthoven, and he looks very similar to how I had pictured him, with his mustache that curls up and semi-bald it was so weird.

Conclusion

This activity taught me where the electrodes should be placed according to their color to get an accurate reading, and to understand the logic behind Einthoven's Triangle and Law. After completing this exercise, I was able to identify and explain in more depth each component of the EKG, for example what is happening during P waves, QRS, or T waves, regarding when the atria and ventricles depolarize and repolarize. I was also able to identify and give a function of each instrument used and the more common abnormalities of EKG patterns.