

60-year-old Caucasian female with no history of heart disease referred she has been experiencing intermittent palpitations for approximately 30 days. Normal physical examination. A 24-hour Holter was performed due to palpitation complain.

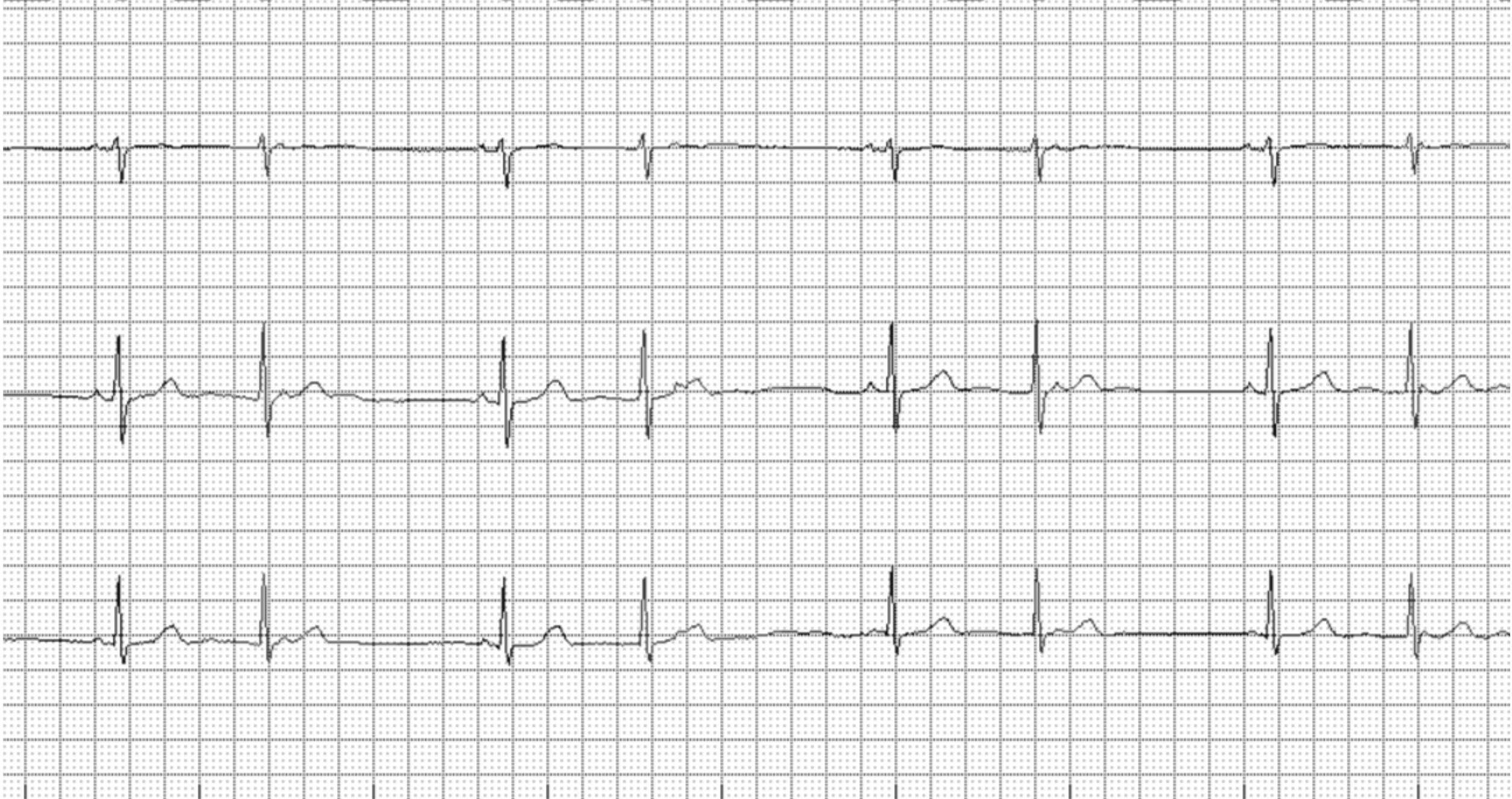
Which is the diagnosis of arrhythmia?

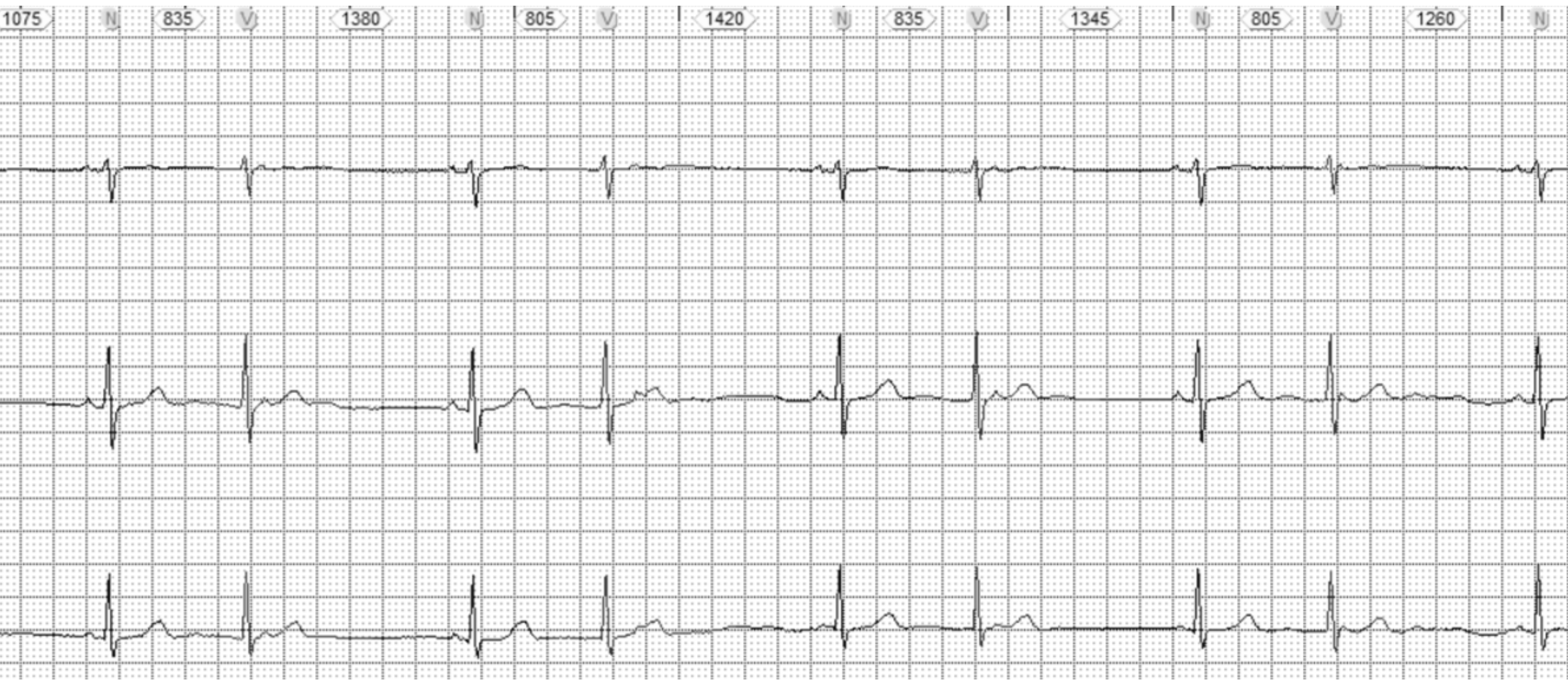
Antônio Thomaz de Andrade, MD

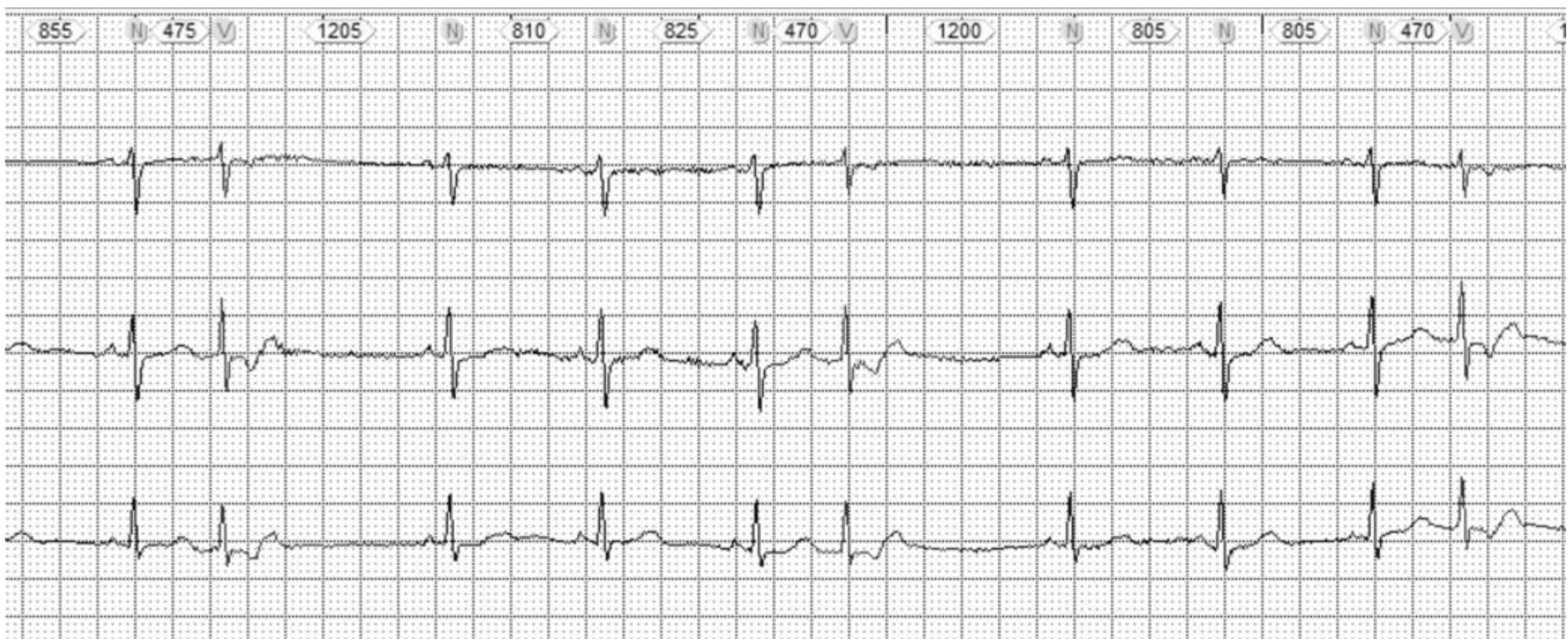
Fortaleza, Ceará, Brazil

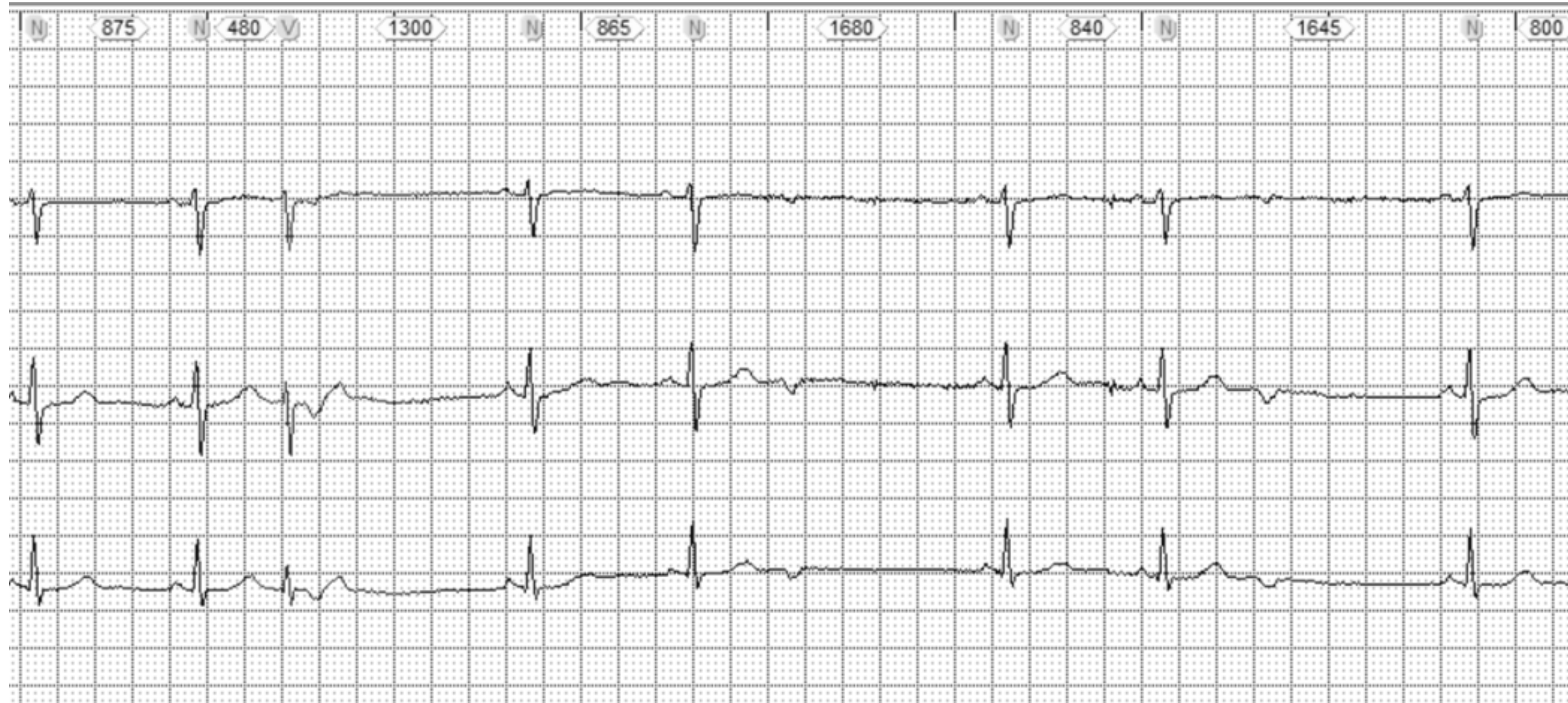


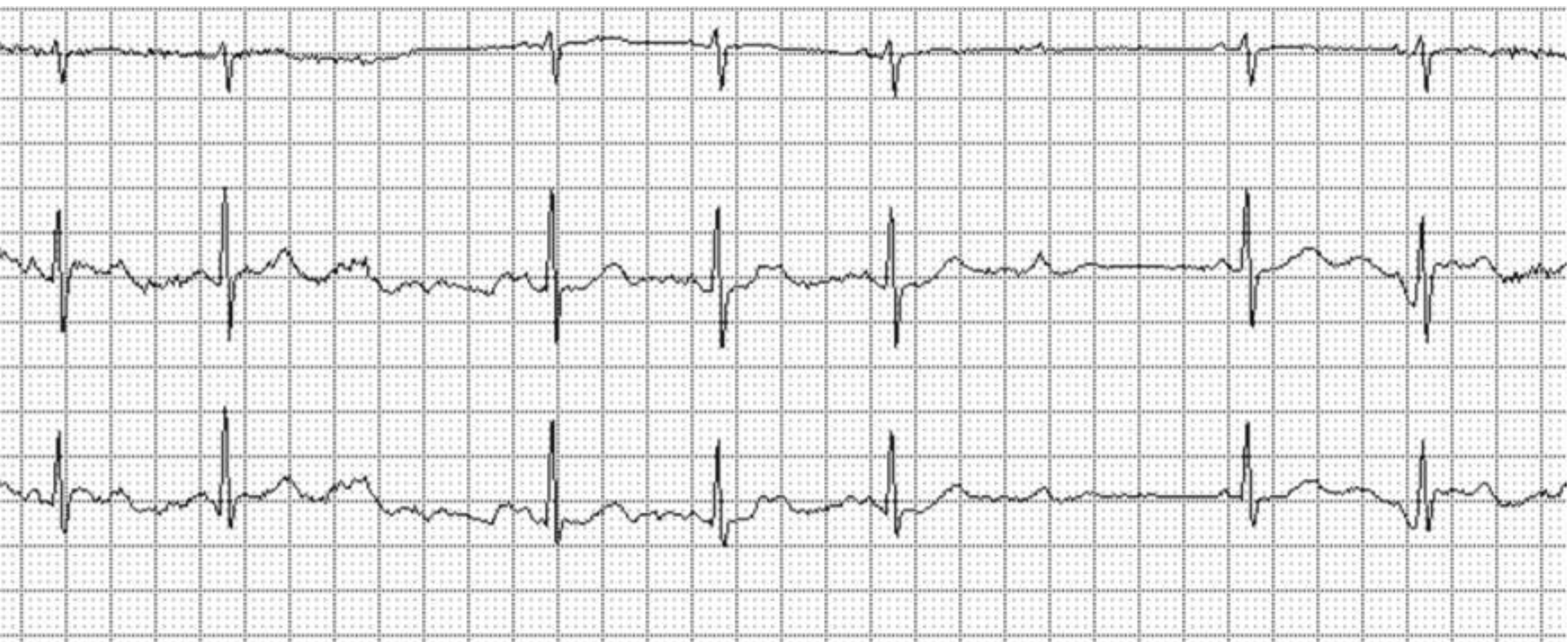
1075 N 835 V 1380 N 805 V 1420 N 835 V 1345 N 805 V 1











**Colleagues opinions**

**Buenas noches estimado Andrés!**

**En principio parece simple, pero, por algún motivo lo subes al Foro.**

**1° y 2° tira extrasistoles hisianas bigeminadas con ondas P retroconducidas que deforman el segmento ST**

**3° tira parece lo mismo pero cuadrigeminadas.**

**4° tira extrasistoles auriculares no conducidas, con morfología bifásicas (plus/minus) con origen probablemente en aurícula derecha y conducen con algún grado de bloqueo interauricular.**

**5° tira extrasistoles auriculares con (hay artificio por movimiento) diferente morfología a la sinusal y positivas no conducidas.**

**En definitiva debe tener enfermedad nódulo sinoauricular y bloqueo interauricular.**

**Atento a la espera de los Maestros del Foro.**

**Saludos cordiales**

**Juan Manzardo MD Mendoza Argentina**



*English*

*Good evening dear Andrés!*

*At first it seems simple, but for some reason you upload it to the Forum.*

*1st and 2nd strip Hisian bigeminated PVCs with retroconducted P waves which deform the ST segment*

*3rd strip looks the same but quadrigeminate.*

*4th strip non-conducted atrial extrasystoles, with biphasic morphology (plus / minus) probably originating in the right atrium and leading to some degree of interatrial block.*

*5th strip atrial extrasystoles with (there is motion artifice) different morphology from sinus and non-conducted positive ones.*

*Ultimately, he must have sinoatrial node disease and interatrial block.*

*Attentive waiting for the Masters of the Forum.*

*Kind regards*

*Juan Carlos Manzardo MD Mendoza Argentina*

Thank you, Andrés, for the five interesting rhythm strips from a patient's Holter monitor. The basic rhythm on all 5 strips is sinus with frequent junctional premature beats (PJC's) often in a pattern of bigeminy. In the first two rhythm strips the sinus rate is 50-60 bpm with slight variation due to sinus arrhythmia with bigeminal PJC's. Of interest the sinus is not interrupted by the junctional prematures as the sinus P waves immediately follows the PJC's but are nonconducted.

In strips 3 and 4 the sinus rate has increased to 70-75 bpm and now the PJC's are followed by retrograde P waves. Strip 4 is particularly interesting because two of the three PJC's are blocked in the antegrade direction (no QRS) but conducted retrograde. The 5th and last strip is somewhat noisy but shows two PJC's conducting retrogradely and blocked in the antegrade direction.

I await your comments and those of our colleagues. I could make ladder diagrams if this would improve my interpretation.

As always, wishing you and your family the best in these troubling times,

**Frank G. Yanowitz, MD**

Professor of Medicine (Retired)

University of Utah School of Medicine

<https://ecg.utah.edu/>



**Creio que o diagnóstico não é difícil. Eu e o Kruse discutimos muito isso.  
Concealed His bundle extrasystoles with retrograde conduction to the atria, only..  
Por que tudo em inglês se estamos ainda no Brasil?  
Chau.  
João Pimenta**

**Hospital do Servidor Público Estadual, Sao Paulo, SP. Brasil  
Doutor em Medicina, Área de Clínica Médica.**

**English**

**I believe the diagnosis is not difficult. Dr Kruse and I discussed this a lot. Our conclusion is:  
Concealed His bundle extrasystoles with retrograde conduction to the atria, only..  
Why is everything in English if we are still in Brazil?  
Bye.**

**Joao Pimenta**

Answer: Dear Dr Pimenta, the reason for the translation into English is due to the fact that several colleagues in our forum are American, Canadian, from United Kingdom and other regions of the world. Additionally, 70% of the participants are Hispanic. Finally, you must agree that English is certainly the language of science in the modern world, with an estimated 98% of all scientific publications being written in the language. The fact that English has become the language of science isn't likely to change any time soon. But having an awareness of the ways in which scientific papers can be made more accessible to those who speak English as a second language can optimize communication and level the playing field to ensure scientists around the world can be heard.

All the best

**Andrés.**



**Boa tarde**

**Ritmo sinusal com duplo passo nodal, que após o segundo QRS que foi conduzido pela via lenta, existe um retorno atrial pela via rápida (ECO atrial) de forma sucessiva.**

**Abrço**

**Marcelo Garcia Leal**

**Good afternoon**

**Sinus rhythm with double nodal step, which after the second QRS that was conducted by the slow route, there is an atrial return via the fast route (atrial ECHO) successively.**

**Hug**

**Marcelo Garcia Leal MD**

**Hisian ectopy**

**Regards!**

**Claudio Hadid**

**Médico Cardiólogo Universitario - Electrofisiólogo**

**Hospital General de Agudos Dr. Cosme Argerich – CEMIC**



Hi Andres:

Thank you, really interesting recording. It looks like AV block 3rd degree, with irregular ventricular action.  
Ljuba

**Bacharová Ljuba**

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International Laser Center, Bratislava, Slovak Republic; Institute of Pathophysiology, Medical Faculty of Comenius University, Bratislava, Slovak Republic. Electronic address: [Ljuba.bacharova@ilc.sk](mailto:Ljuba.bacharova@ilc.sk)



Ritmo sinusal com extrassístoles juncionais ( EJ) e pseudo-bloqueio AV por EJ ocultas.

Grande abraço, Acácio!

### **Acacio Fernandes Cardoso**

Dr. Acácio Fernandes Cardoso é cardiologista pela Universidade Estadual de Montes Claros; especialista em arritmias cardíacas pelo Instituto do Coração/HCFMUSP; possui certificado de atuação na área de eletrofisiologia invasiva conferido pela Sociedade Brasileira de Arritmias Cardíacas - SOBRAC e pela Associação Médica Brasileira – AMB.

He is a cardiologist from the State University of Montes Claros; specialist in cardiac arrhythmias by Instituto do Coração/HCFMUSP; He has a certificate of performance in the field of invasive electrophysiology conferred by the Brazilian Society of Cardiac Arrhythmias - SOBRAC and by the Brazilian Medical Association - AMB.



## Final diagnoses



English

The images of these tracings correspond to different periods of a 24h-Holter of the same patient, female and 60 years of age. It was possible to observe several early narrow QRS beats, similar to that determined by sinus rhythm followed by atrioventricular conduction, but which were not preceded by P waves, being mostly dissociated or with retrograde conduction to the atrium (followed by P wave of morphology opposite to the sinus rhythm and with a fixed relationship with the QRS that preceded it), our diagnosis was junctional or Hissian origin beats (there is disagreement among authors as to which would be the most correct term, but we will use the latter ).It was also possible to notice discretely early atrial beats not followed by QRS (and whose precocity did not seem to be enough to justify the atrioventricular block), with morphology identical to the retrograde P wave presented before by early Hissian beats and often showing a trigeminism relationship with them, making us raise the hypothesis of occult Hissian premature ventricular contractions (PVCs) (with anterograde block) and retrograde conduction through the atrium. Additionally, periods of second-degree atrioventricular block (AVB) were also observed, with no apparent lengthening of the PR interval previously, which could lead us to think of a Mobitz II second-degree AVB (usually an indication of a pacemaker despite the associated symptoms), injury to the infranodal conduction system. However, in the context of frequent early Hissian beats, sometimes presenting anterograde and sometimes retrograde conduction block, it is possible to raise the hypothesis of pseudo AVB due to hidden Hissian PVCs, which would not lead to an indication of a definitive pacemaker.

Suggested bibliography.

1. Fisch C, Zipes DP, McHenry PL. Electrocardiographic manifestations of concealed junctional ectopic impulses. *Circulation*. 1976 Feb;53(2):217-23. doi: 10.1161/01.cir.53.2.217. PMID: 1245029.
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3. Belic N, Grais M, Singer DH, Cohen H. Pseudo atrioventricular block. *Arch Intern Med*. 1979 Apr;139(4):459-60. doi: 10.1001/archinte.139.4.459. PMID: 435001.
4. Woo Seung Shin et al, Images in cardiology. Pseudoatrioventricular block manifesting as a 2:1 atrioventricular block and advanced atrioventricular block because of concealed junctional ectopic impulses *J Am Coll Cardiol*. 2010 Aug 24;56(9):e17. doi: 10.1016/j.jacc.2009.10.095.
5. Pablo A Chiale, Marcelo V Elizari. The electrocardiographic diagnosis of intraventricular blocks coexisting with ventricular preexcitation *J Electrocardiol*. 2012 Sep;45(5):515-24. doi: 10.1016/j.jelectrocard.2012.04.002.
6. Hollanda L, Sobral R, Luize C, Carvalho M, Andrade J, Dietrich C. Pseudo atrioventricular block most likely caused by junctional extrasystoles mimicking Mobitz II second degree atrioventricular block: A case report. *HeartRhythm Case Rep* . 2020 May 18;6(8):507-510. doi: 10.1016/j.hrcr.2020.05.002.

Portuguese

As imagens a seguir correspondem a diferentes períodos de um Holter de uma mesma paciente, sexo feminino e 60 anos de idade.

Durante o exame foi possível observar vários batimentos precoces de QRS estreito, semelhante ao determinado pelo ritmo sinusal seguido por condução atrioventricular, porém que não eram precedidos por onda p, se encontrando na maioria das vezes dissociados ou com condução retrógrada para o átrio (seguidos por onda p de morfologia oposta ao sinusal e com relação fixa com o QRS que a precedia), nos levando a pensar na possibilidade de uma origem juncional ou hissiana (existe uma discordância entre autores de qual seria o termo mais correto, mas iremos usar o último).

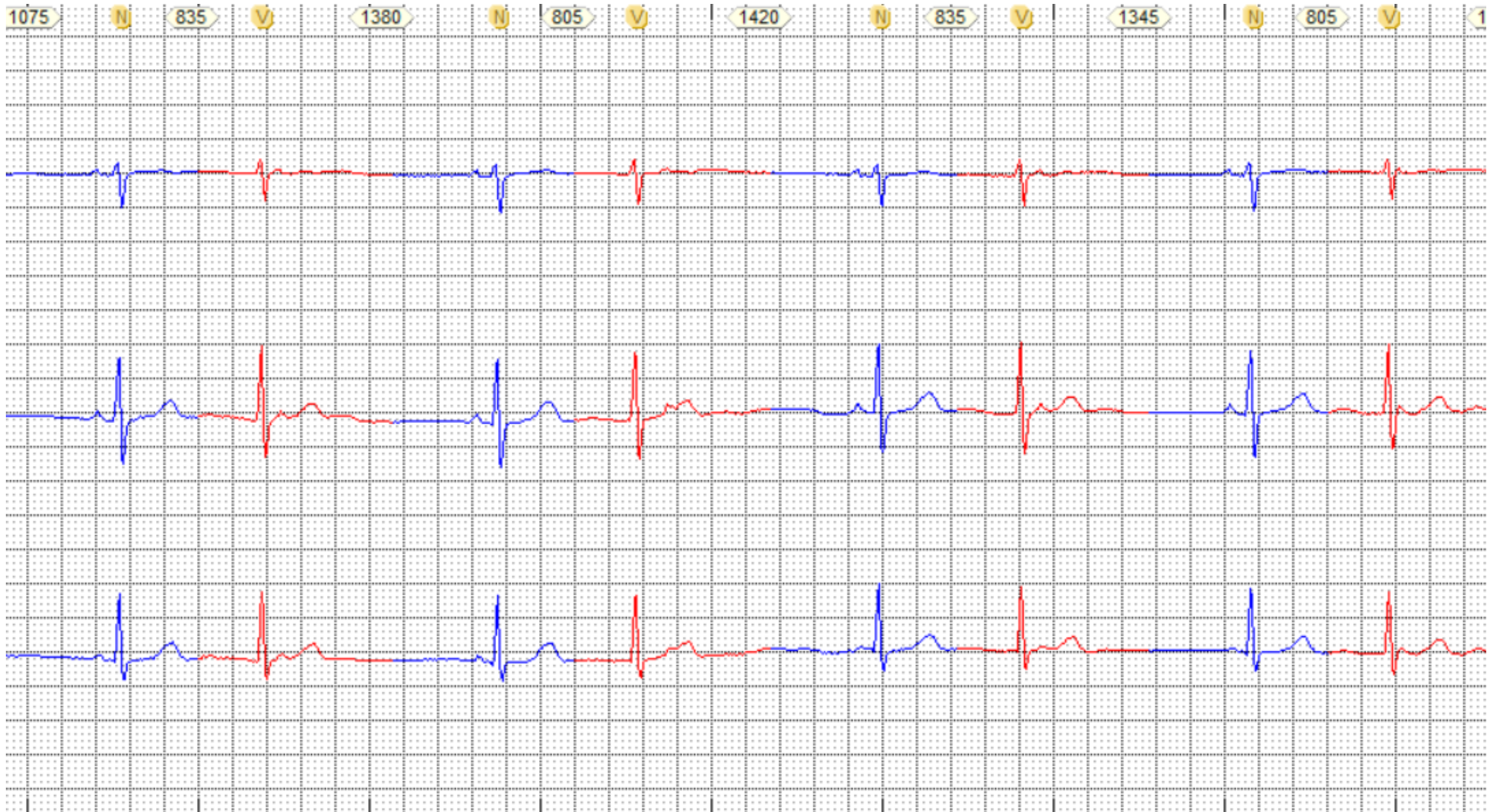
Também foi possível perceber batimentos atriais discretamente precoces não seguidos por QRS (e cuja precocidade não parecia ser o suficiente para justificar o bloqueio atrioventricular), de morfologia idêntica a onda p retrograda apresentada antes pelos batimentos hissianos precoces e muitas vezes apresentando relação de trigeminismo com eles, nos fazendo levantar a hipótese de extrassístoles hissianas ocultas (com bloqueio anterógrado) com condução retrograda pelo átrio.

Também se observou períodos de bloqueio atrioventricular (BAV) de 2º grau, sem aparente alargamento do intervalo PR previamente, o que poderia nos levar a pensar em um BAV de 2º grau Mobitz II, normalmente uma indicação de marcapasso a despeito de sintomas por estar associado a lesão do sistema de condução infranodal.

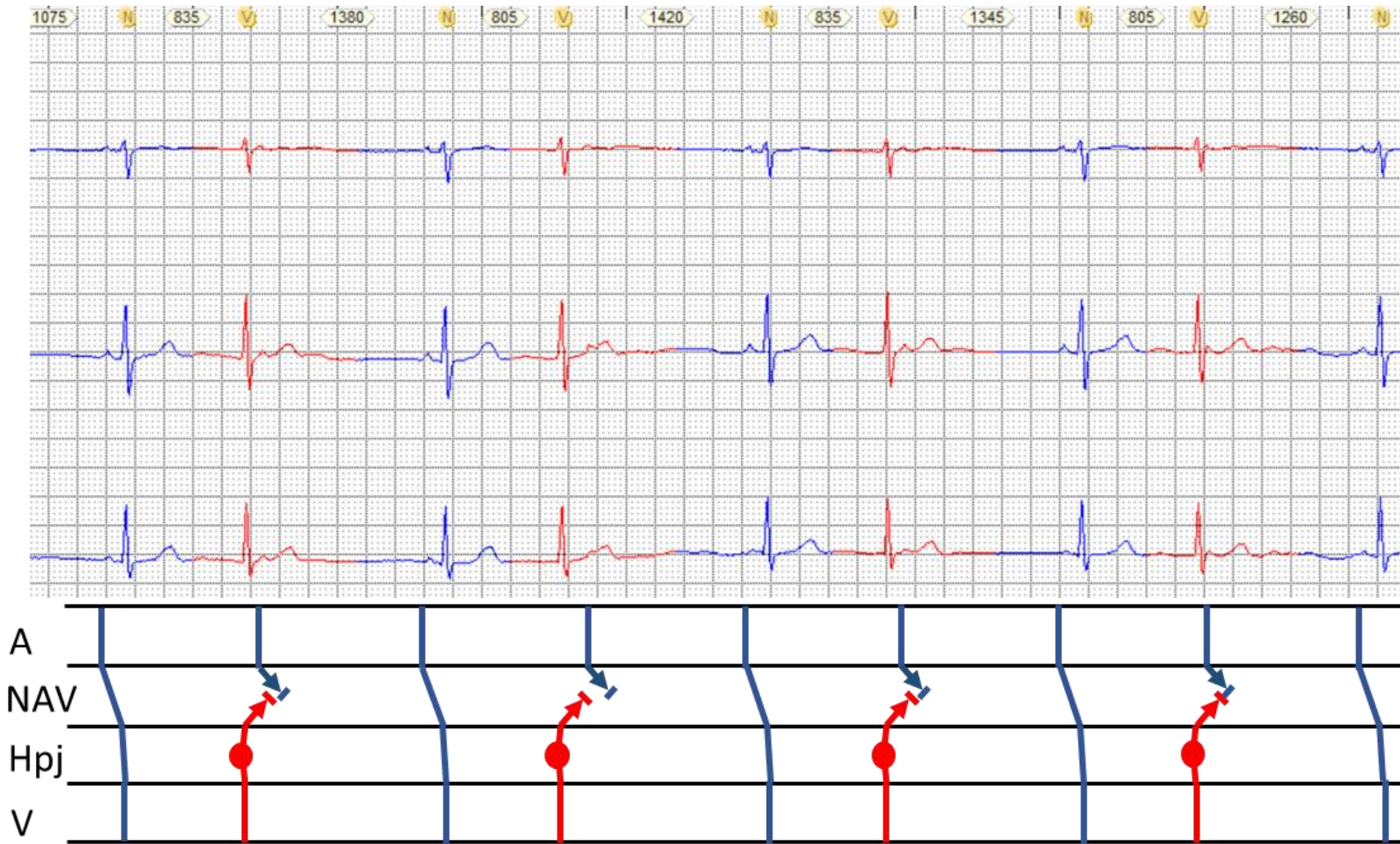
Porém, no contexto de frequentes batimentos hissianos precoces, ora apresentando bloqueio da condução anterógrada e ora da retrograda é possível levar a hipótese de pseudo bloqueio atrioventricular por extrassístoles hissianas ocultas, que não levaria a uma indicação de marcapasso definitivo.

Las imágenes del trazado corresponden a diferentes periodos de un Holter de un mismo paciente, femenino y de 60 años. Durante la exploración fue posible observar varios latidos con QRS estrechos precoces, similares al determinado por ritmo sinusal seguido de conducción auriculoventricular, pero que no fueron precedidos por una onda P, siendo mayoritariamente disociados o con conducción retrógrada a la aurícula (seguida de P onda de morfología opuesta a la sinusal y con una relación fija con el QRS que la precedió), esto nos lleva a pensar en la posibilidad de un origen junctional o Hissiano (hay desacuerdo entre los autores sobre cuál sería el término más correcto, pero usaremos este último). También notamos latidos auriculares discretamente precoces no seguidos de su correspondiente complejo QRS (y cuya precocidad no pareció ser suficiente para justificar el bloqueo auriculoventricular), con morfología idéntica a la onda P retrógrada presentada antes por los latidos Hissianos tempranos y que a menudo muestra un relación del trigeminismo con ellos, haciéndonos plantear la hipótesis de **extrasístoles Hissianas ocultas** (con bloqueo anterógrado) y conducción retrógrada a través de la aurícula. También se observaron periodos de bloqueo auriculoventricular (BAV) de segundo grado, sin aparente prolongación del intervalo PR previo, lo que podría llevarnos a pensar en un BAV de segundo grado Mobitz II (habitualmente indicación de marcapaso a pesar de los síntomas asociados). Lesión al sistema de conducción infranodal. Sin embargo, en el contexto de frecuentes latidos precoces del Hiss, presentando en ocasiones bloqueo de conducción anterógrado y retrógrado, es posible plantear la hipótesis de un pseudobloqueo auriculoventricular por extrasístoles Hissianas ocultas, que no daría lugar a la indicación de marcapasos definitivo.

# Hissian PVCs and their various facets



## Anterograde conduction and retrograde block (dissociated from the P wave)



Early beats with morphology identical to the QRS in sinus rhythm conducted by the atrioventricular node but dissociated from the P wave, leading us to think of a Hissian/Junctional origin.

From the Lewis diagram we notice that there is an anterograde but not a retrograde conduction.

## Anterograde and retrograde conduction

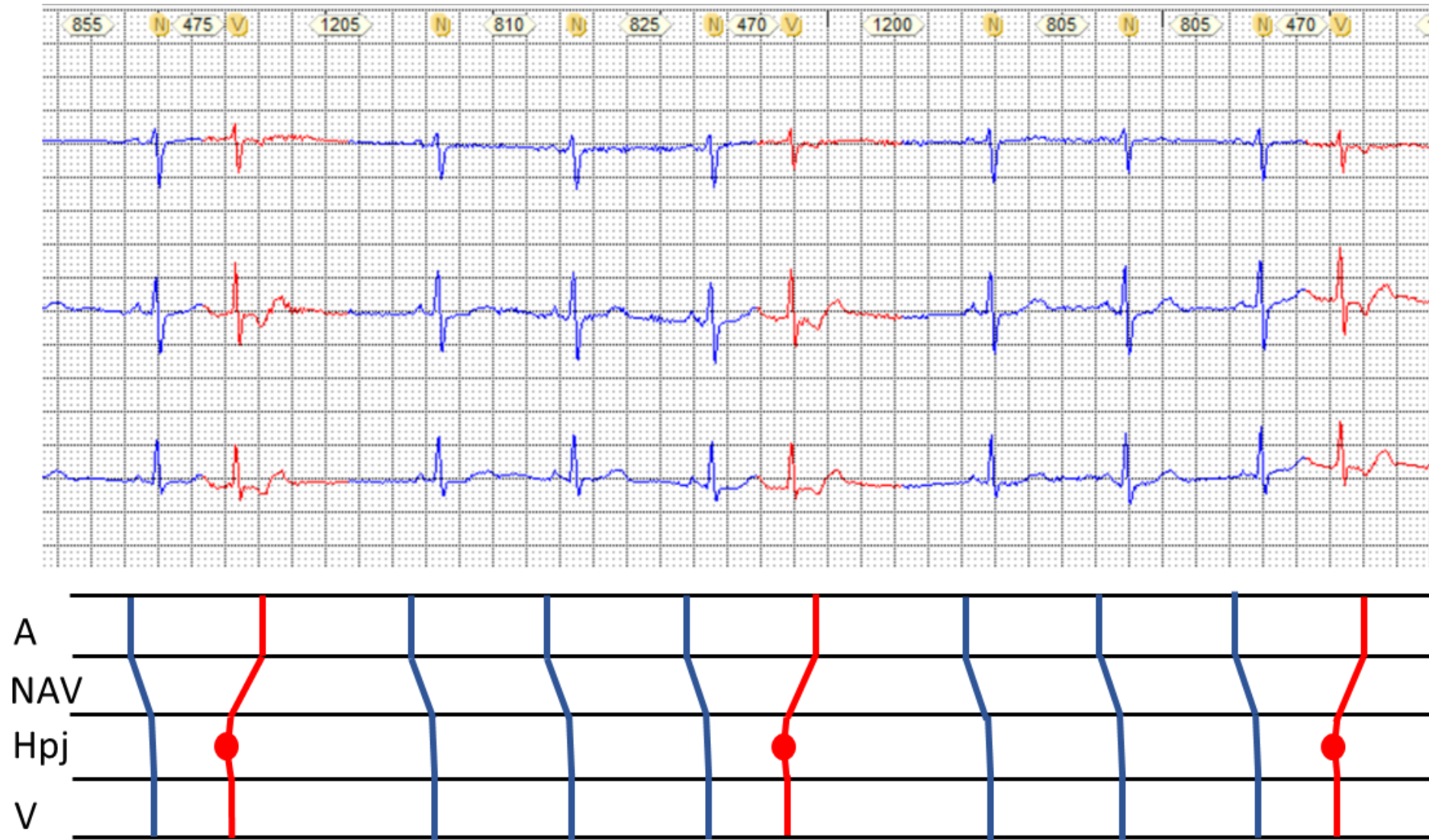


Figure 2: The same premature beat this time followed by a P wave of morphology opposite that of the sinus rhythm and in fixed relation to the QRS, leading to the hypothesis of retrograde conduction to the atrium.

## Retrograde conduction and anterograde (hidden) block

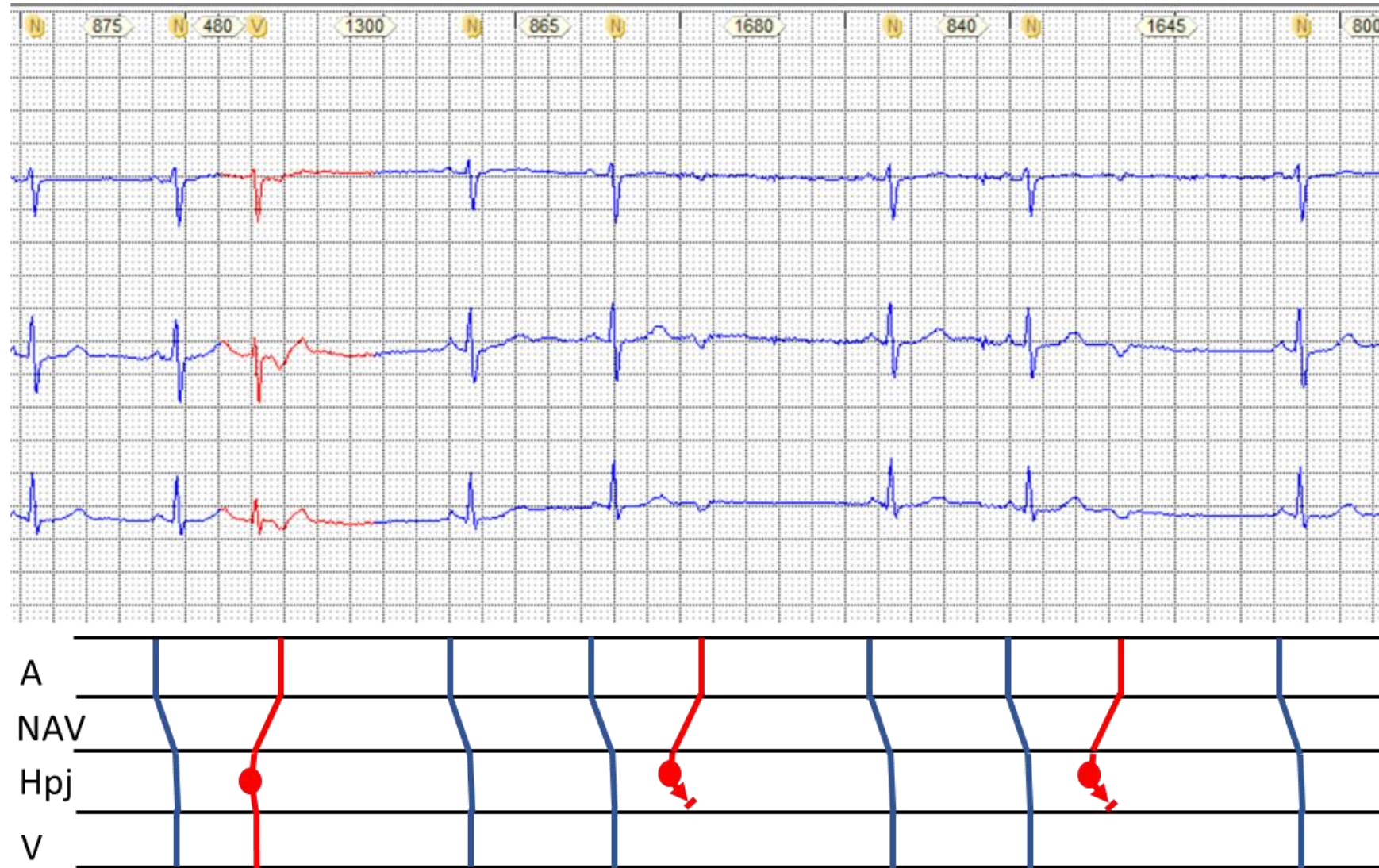


Figure 3: Premature P waves of morphology opposite to sinus, identical to the retrograde P wave and in trigeminy with hisian/junctional premature beat suggesting that it is the same event but with anterograde conduction block

## Hidden Hissian PVCs determining PSEUDO ATRIOVENTRICULAR BLOCK (anterograde and retrograde block)

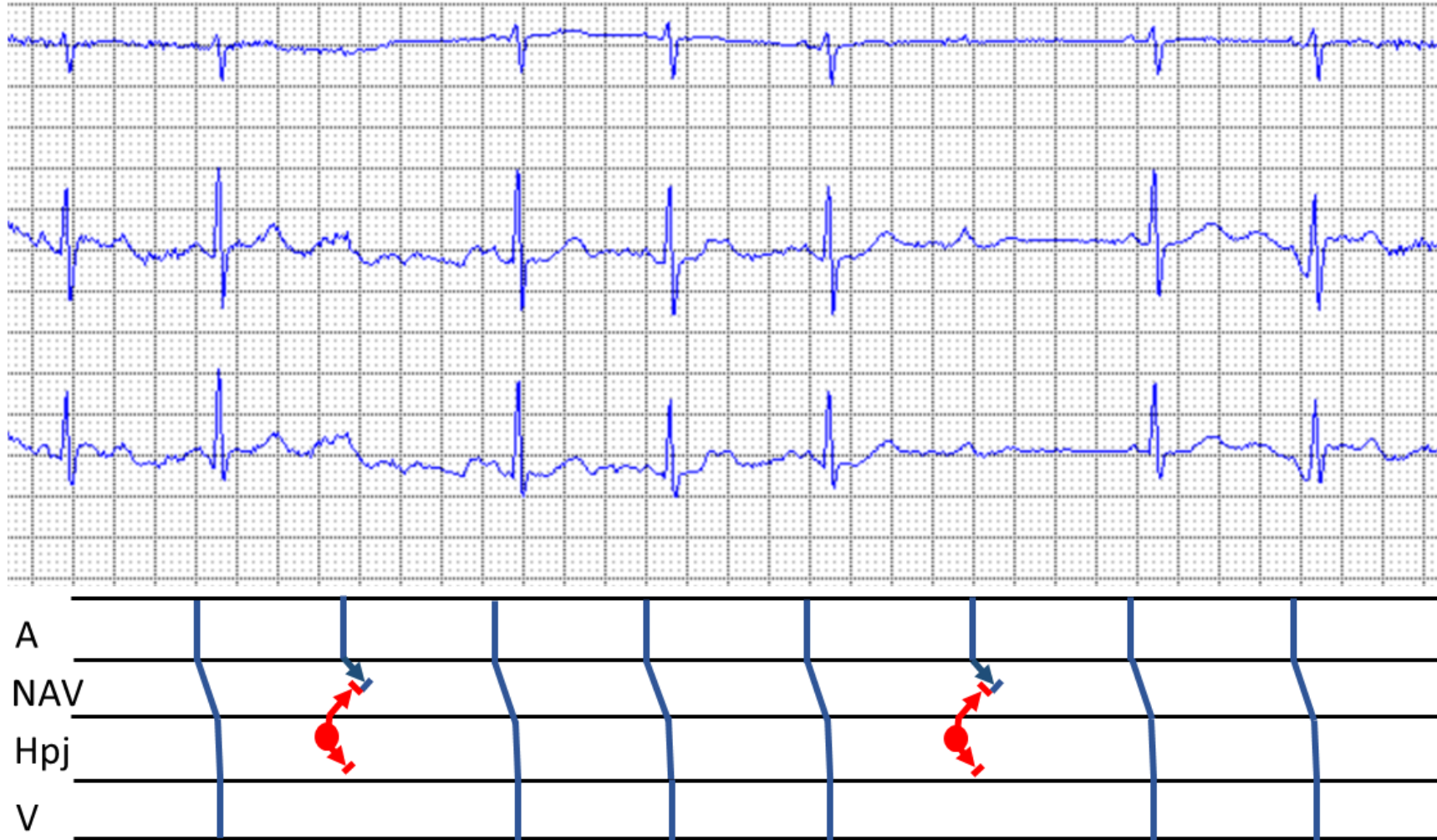


Figure 4: Episode of 2nd degree atrioventricular block . In this context it may lead to the hypothesis of pseudo-AV block by concealed Hissian/junctional premature beats. In this hypothesis, there was anterograde and retrograde block. The premature Hissian/junctional beats did not present electrocardiographic expression but determined AV block.