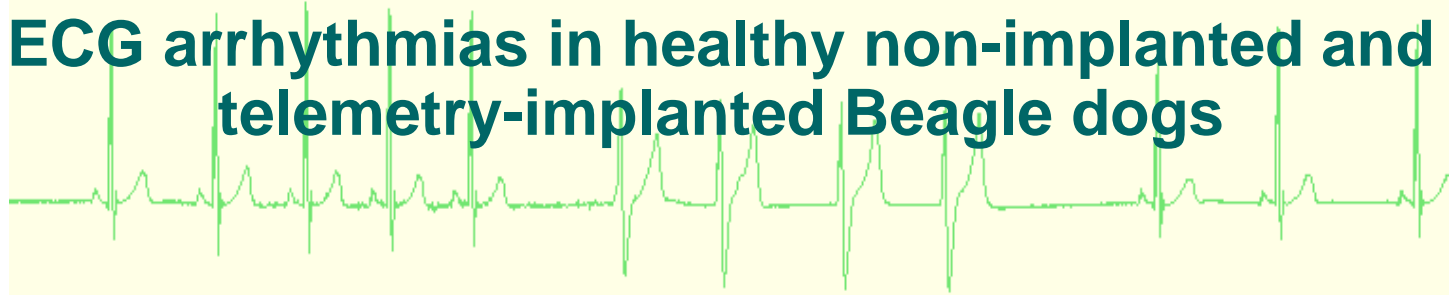




## ECG arrhythmias in healthy non-implanted and telemetry-implanted Beagle dogs



Frank Cools, Annik Vanlommel, Sigrid Janssens,  
Ard Teisman, Rob Towart & David Gallacher

Webinar, Feb. 23, 2011

Part 2: results



## Historical

## Comparison of % of dogs with specific arrhythmia

year of study	1961	1995	2007	2009
breed	all breeds	beagle	mongrel	beagle
dog position/situation	restrained, lateral recumbency	holtered freely moving	holtered freely moving	restrained, lateral recumbency
ECG sample	10s ?	18-24h	~2.7h	10s
selection	vet. hospital during consultation	pre-scan before studies	pre-scan before surgical proc.	pre-scan before studies
n	3000	228 (M113/F115)	40	2450
authors	Patterson, Detweiler, et al.	Ulloa, Houston, Altrogge	Duerr, Carr et al.	Gauvin, Tilley et al.
Ventricular compl.	1.4	19-26 (M-F)	10	0.16
2° AVblock	0.5	9-20 (M-F)	2.5	0.57

Arrhythmia detection dependent on - total scanned period (10 s = 0.3% of an hour)  
 - stress situation of the dog (recumbency ~ high Heart rate)



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## Prevalence of ECG arrhythmias in non-implanted beagle dogs (day-night)

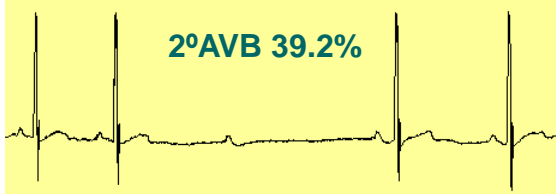
**Junctional esc. complex 41.2-58.8%**



**Sinus pause 15.7-39.2%**



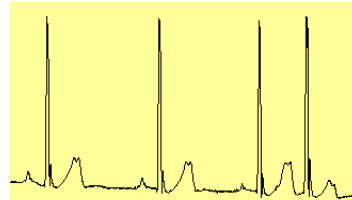
**2°AVB 39.2%**



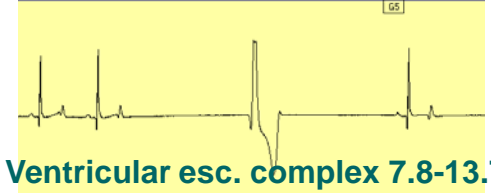
**Runs Junctional esc. complexes 13.7-33.3%**



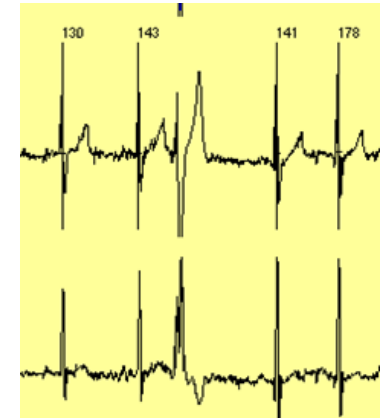
**Atrial prem. complex 35.3-45.1%**



**Ventricular esc. complex 7.8-13.7%**



**Ventricular prem. complex 15.7-11.8%**



And runs of JEC (13.7-33.3%), JT (13.7%), runs of VEC (3.9-2.0%)

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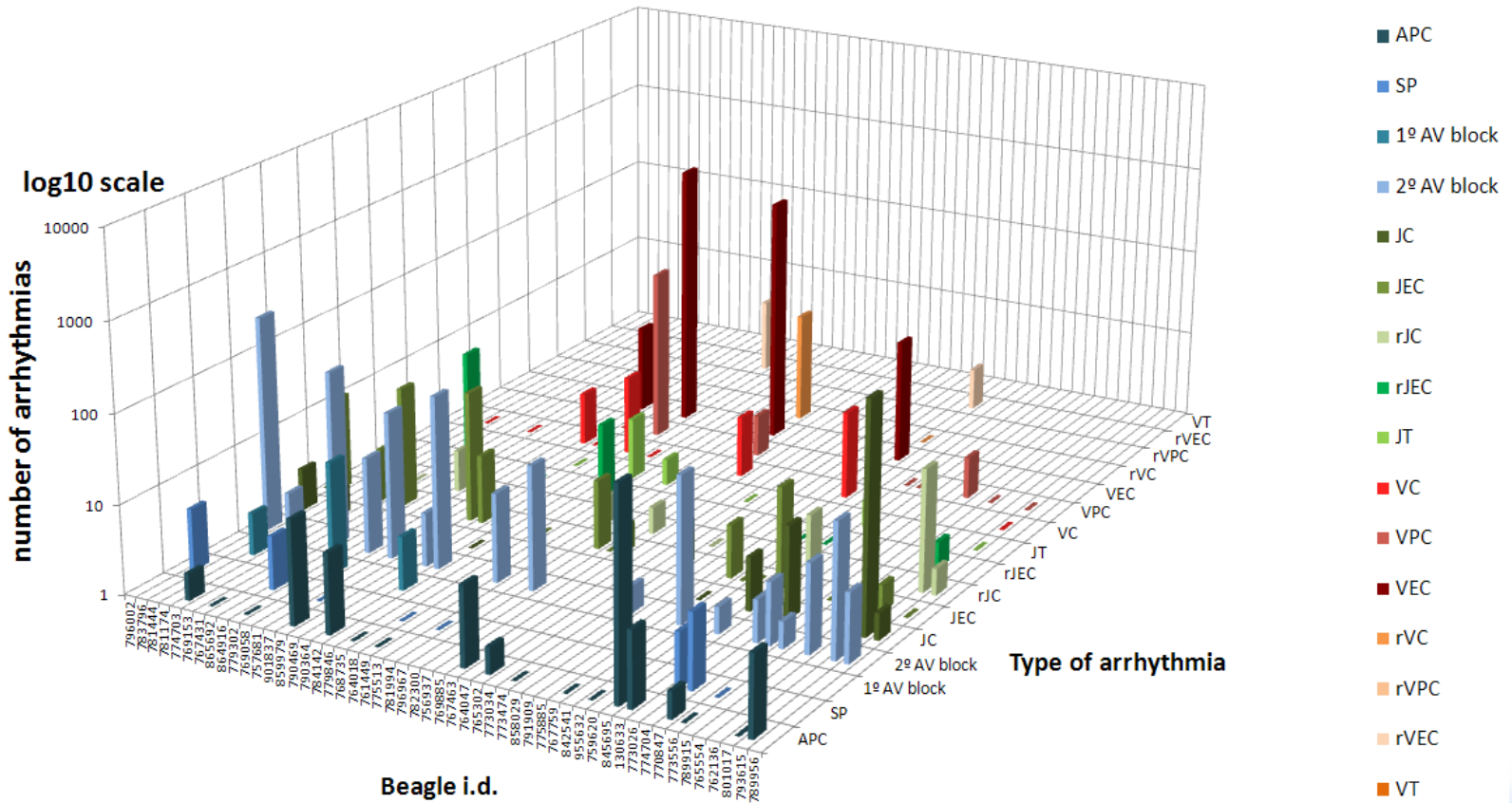


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results: pooled M/F, pooled D/N, non-implanted, n=51

# arrhythmias/beagle

day



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results: pooled M/F, pooled D/N, non-implanted, n=51

22h Arrhythmia	n=51 % of dogs	Number of non-implanted dogs/arrh. frequency bin				
		0	1-10	11-100	101-1000	>1000
APC	58.8	21	24	4	1	1
SP	43.1	29	12	10	0	0
1°AVB	15.7	43	6	2	0	0
2°AVB	49.0	26	13	7	5	0
JC	39.2	31	17	2	1	0
JEC	70.6	15	26	10	0	0
rJC	27.5	37	12	1	1	0
rJEC	39.2	31	18	2	0	0
JT	17.6	42	8	1	0	0
VC	27.5	37	10	3	1	0
VPC	21.6	40	10	0	1	0
VEC	13.7	44	3	2	1	1
rVC	3.9	49	1	1	0	0
rVPC	0.0	51	0	0	0	0
rVEC	3.9	49	1	1	0	0
VT	0.0	51	0	0	0	0



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Summary: pooled M/F, pooled D/N, non-implanted, n=51

**prevalence (as % of group):** Junctional: up to 70%  
2°AVB: up to 50 %  
APC: up to 60 %  
Ventricular: up to 30%  
*higher for APC and Junctional during the night*

*Only **one** dog in 51 had **no** arrhythmias at all.*

**frequency (absolute number/22h):** Most dogs have low frequencies of arrhythmias (<100 arrhythmias/22h)  
*higher freq. of APC's and Junctional episodes during the night*

*worth mentioning:*

- (1) *one dog had over 1000 **APC's***
- (2) *another one had over 1000 **ventricular complexes***
- (3) *5 dogs had between 100 and 1000 2°AVB*
- (4) *~5% of the dogs >100 arrhythmias/22h*

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results: 10 female dogs, 33 weeks after implantation of an ITS LV probe

22h	n=10	post-impl.4 (233d) number of female dogs/arrh. bin				
Arrhythmia	% of dogs	0	1-10	11-100	101-1000	>1000
APC	70.0	3	7	0	0	0
SP	50.0	5	4	1	0	0
1°AVB	0.0	10	0	0	0	0
2°AVB	30.0	7	2	1	0	0
JC	80.0	2	7	1	0	0
JEC	90.0	1	6	3	0	0
rJC	70.0	3	6	1	0	0
rJEC	70.0	3	5	2	0	0
JT	50.0	5	4	1	0	0
VC	10.0	9	1	0	0	0
VPC	10.0	9	1	0	0	0
VEC	0.0	10	0	0	0	0
rVC	0.0	10	0	0	0	0
rVPC	0.0	10	0	0	0	0
rVEC	0.0	10	0	0	0	0
VT	0.0	10	0	0	0	0

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## conclusions

There is a **clear prevalence and incidence but enormous variability** of arrhythmias in the Beagle dog population which will confound the interpretation of arrhythmia studies in this model

A LV probe through the apex of a dog's heart increases the incidence of **ventricular complexes, runs and tachycardia**, which seem to remain – at least in some of the dogs – certainly until approximately **8 weeks after surgery**

The reason for the sudden increasing and decreasing numbers - in a limited number of Beagle dogs - of **APC and JC** (originating above the A-V node of the heart), which is likely independent of the presence of a LV probe, remains **unclear**

**A thorough evaluation of ECG morphology** of naive Beagle dogs before compound evaluation will help to exclude arrhythmia burdened dogs – certainly those having excessive numbers of ventricular complexes - and will improve the interpretation of arrhythmia studies in telemetered and non-telemetered dogs

But still **incidence and severity of arrhythmias may** vary from day to day



**Safety  
Pharmacology  
Society**

**Thanks**

Questions/remarks?

**SPS 11<sup>th</sup> Annual Meeting**  
***September 19-22, 2011***

A promotional banner for the SPS 11th Annual Meeting. It has a green top section and a yellow bottom section. On the left is the SPS logo. The text 'Safety Pharmacology Society' is in yellow on the green background, and 'September 19-22, 2011' is in green on the yellow background. The main text '11<sup>th</sup> Annual Meeting' and 'Innsbruck, Austria' is in green on the yellow background. A small image of a building with a dome is on the right.

**Safety Pharmacology Society**  
*September 19-22, 2011*

**11<sup>th</sup> Annual Meeting**  
***Innsbruck, Austria***

**WEBINAR**