

Spitzenmedizin für das alternde Herz – Interventionen und Devices

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Chair, EHRA Education Committee

Conflict of Interest Statement

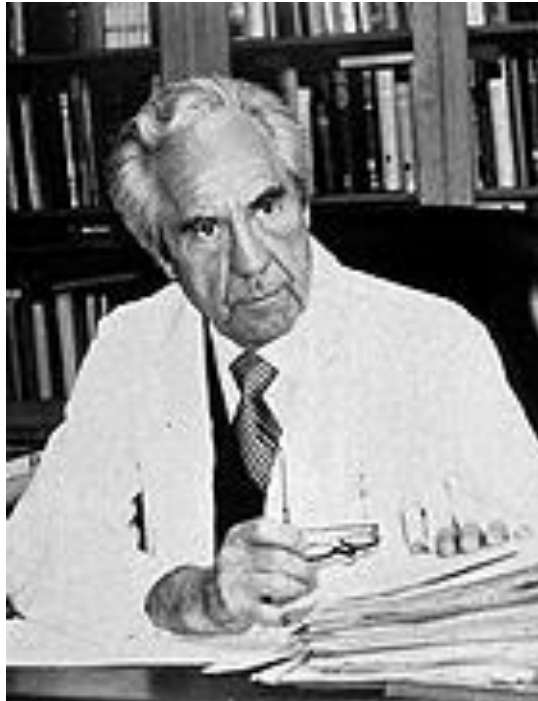
- Consulting / Speaker: Abbott, Amgen, Astra Zeneca, AtriCure, Bayer, Biosense Webster, Biotronik, BMS, Boehringer Ingelheim, Boston Scientific, Daiichi-Sankyo, Medscape, Medtronic, Novartis, Pfizer, Sanofi-Aventis, WebMD, Zoll
- Grants (through institution): Bayer, Biotronik, Boston Scientific, Daiichi-Sankyo, Medtronic, Abbott
- Ownership CorXL

"Nur weil wir es können
müssen wir es nicht
machen"

8. Oktober 1958

An Implantable Pacemaker for the Heart

SOMMAIRE: Description d'un régulateur compact, destiné à être implanté sous la peau au niveau de l'épigastre. Le générateur d'impulsion est composé d'un multivibrateur avec un transistor au silicium. L'amplitude des impulsions est d'environ 2 volts, leur durée est d'environ 1,5 milli-seconde. Leur fréquence est constante et d'environ 80 pulsations par seconde. La source d'énergie est un petit accumulateur au cadmium-nickel, composé de deux séries interconnectées de cellules, de 60 mAh chacune.



ONE of the major problems in connection with the permanent use of pacemakers for the heart is the prevention of infection through the channel where the cable is brought out through the skin.

A compact pacemaker is described which is intended to be implanted subcutaneously in the epigastrium. The pulse generator consists of a repetitive blocking oscillator with a silicon transistor. The pulses are fed to the base-circuit of a second silicon transistor. The collector circuit of the second transistor is connected to the electrode over an RC network. The pulse height is about 2 V, and the pulse duration is about 1.5 msec. The pulse frequency is constant and about 80 pulse/sec.

The source of energy is a small nickel-cadmium accumulator consisting of two series-connected cells of 60 mAh each. The apparatus also contains a

coil and a silicon diode, which form the secondary circuit of an inductive charging device. The primary circuit of this device consists of a 150 kc/s generator feeding a large diameter coil. This coil is placed over the pacemaker outside the skin, when the accumulator is charged.

The electrode cable had to be specially developed in order to withstand the movements in the body (about 10^8 bends every day).

Experience from animal experiments and one human case are reported.

R. Elmqvist and A. Senning,
Stockholm

Implantation heute

Kurzhospitalisation

Lokale Betäubung, i.d.R. keine Narkose notwendig

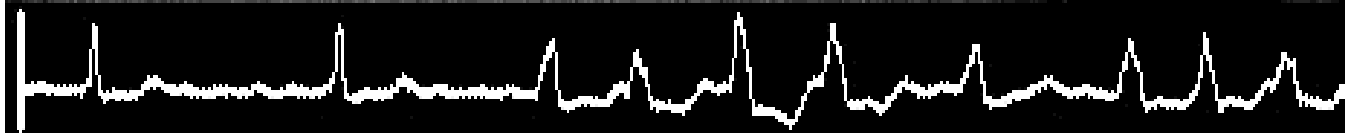
Dauer: 30 Minuten (PM) bis zu 2h (CRT)

Zugänge: V. subclavia, axillaris, cephalica

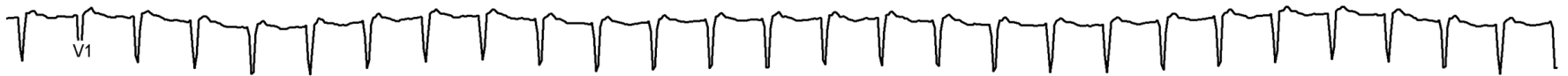
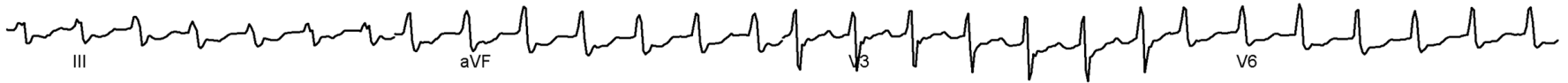
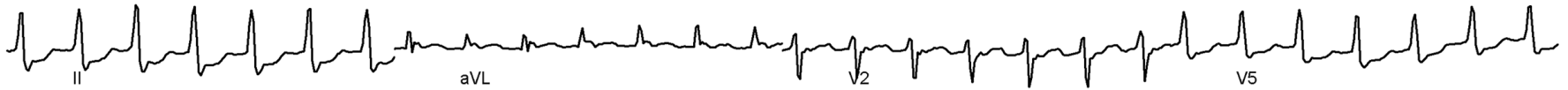
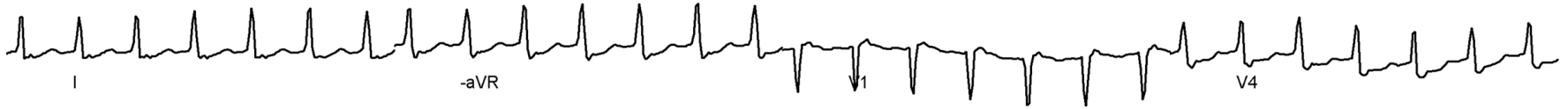
Komplikationen (2-5%):

- Nachblutung / Hämatom
- Infektion
- Pneumothorax
- Seltene (Perforation u.A.)

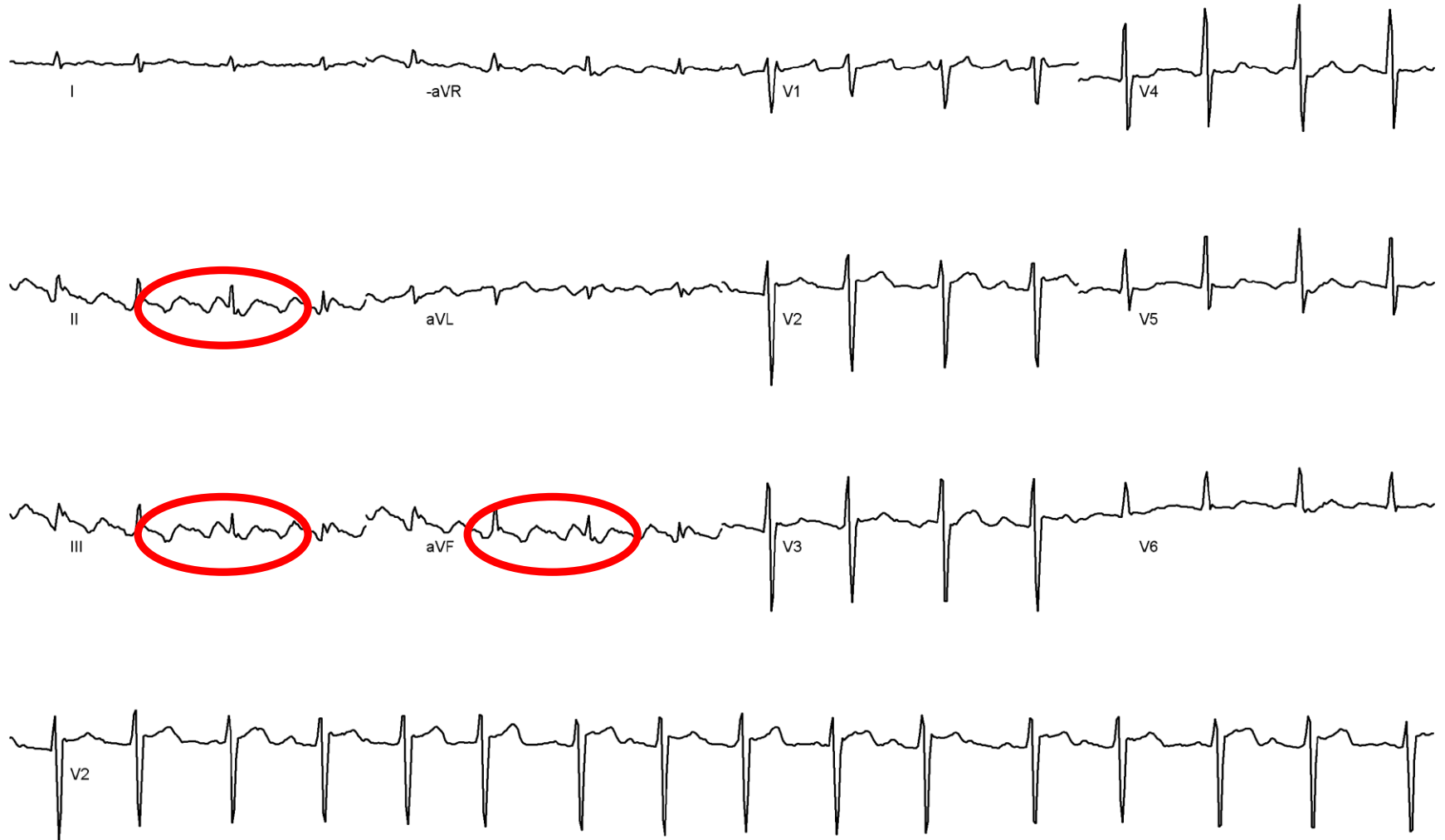




Typische AVNRT



"Typisches" Vorhofflattern



Rhythmusstörungen

Bradykard

Tachykard

"Supra- hissär"

- Sinusbradykardie
- AV Block I°
- AV Block II° (Typ I)

- Vorhofflimmern **50-80%**
- Atriale Tachykardie **~80%**
- Vorhofflattern **80-95%**
- AVNRT **95-98%**
- AVRT / WPW **80-98%**

"Infra- Hissär"

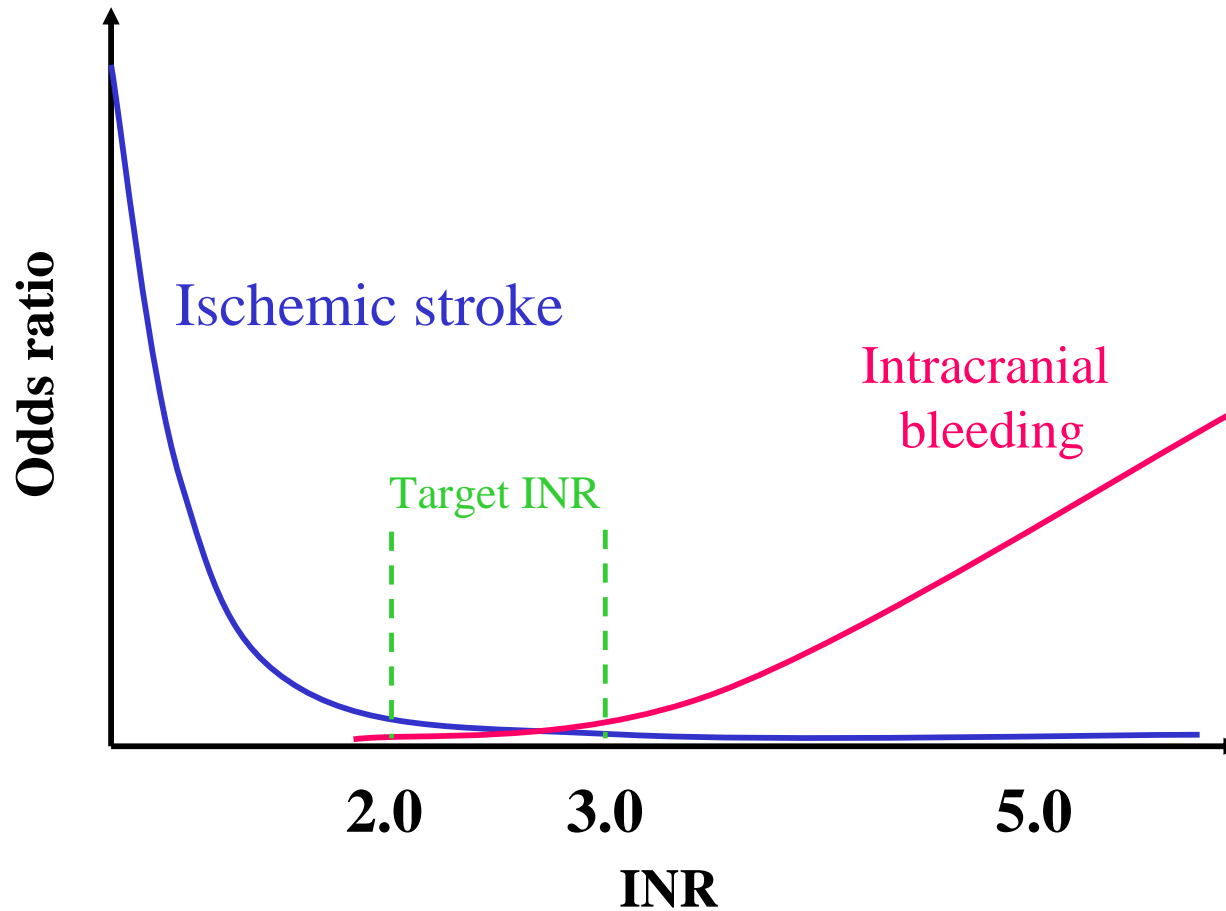
- AV Block II° (Typ II)
- AV Block III°

- Ventrikuläre Tachykardie
- Kammerflimmern

Schrittmacher

Schrittmacher

About the target INR...



Intrakranielle Blutungen unter VKA

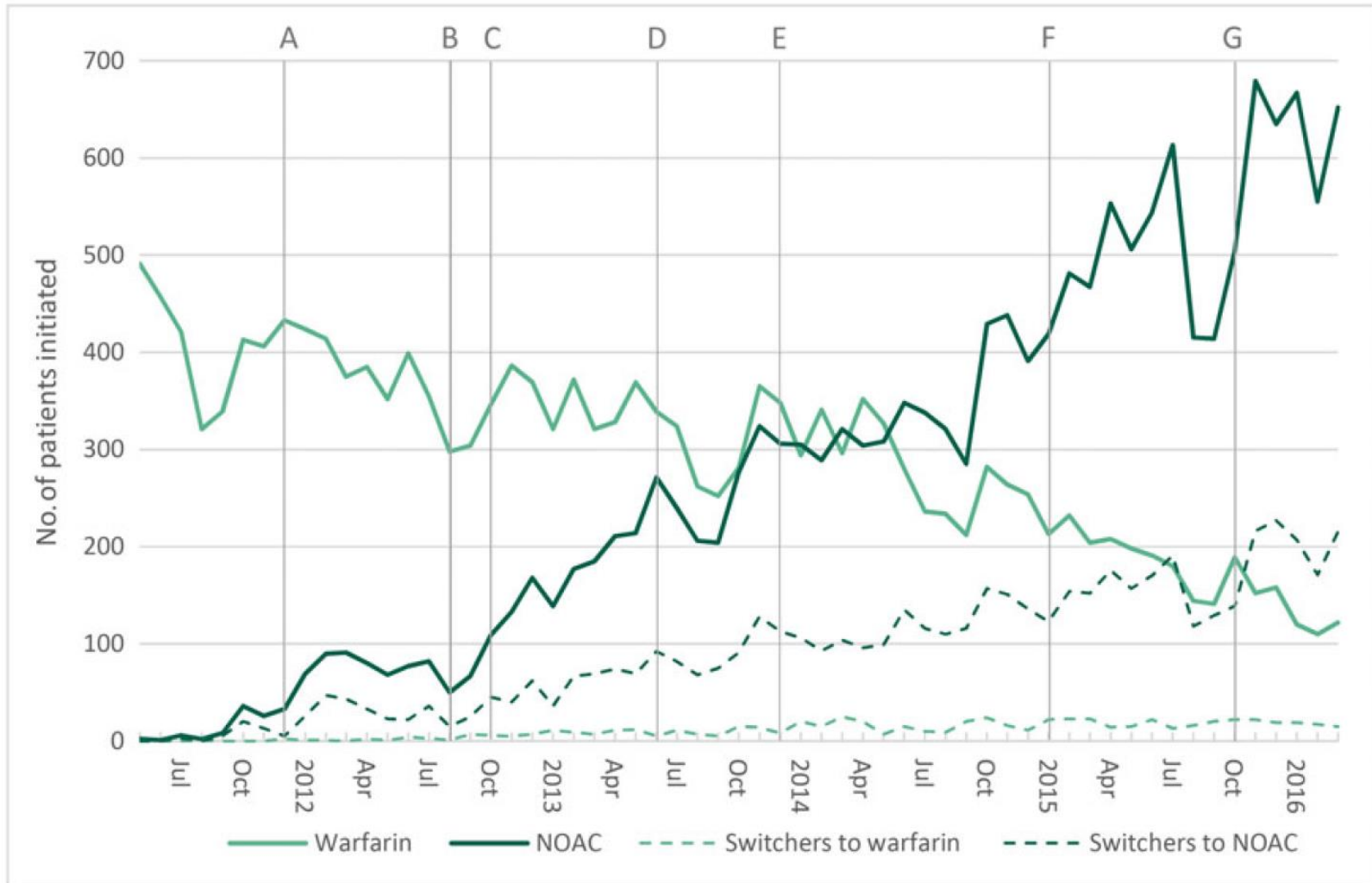
- **Incidence of ICH:** 0.96% (174)
 - Warfarin: 70.1% (122)
 - Apixaban: 29.9% (52)

INR <3.0 ≈ 80%

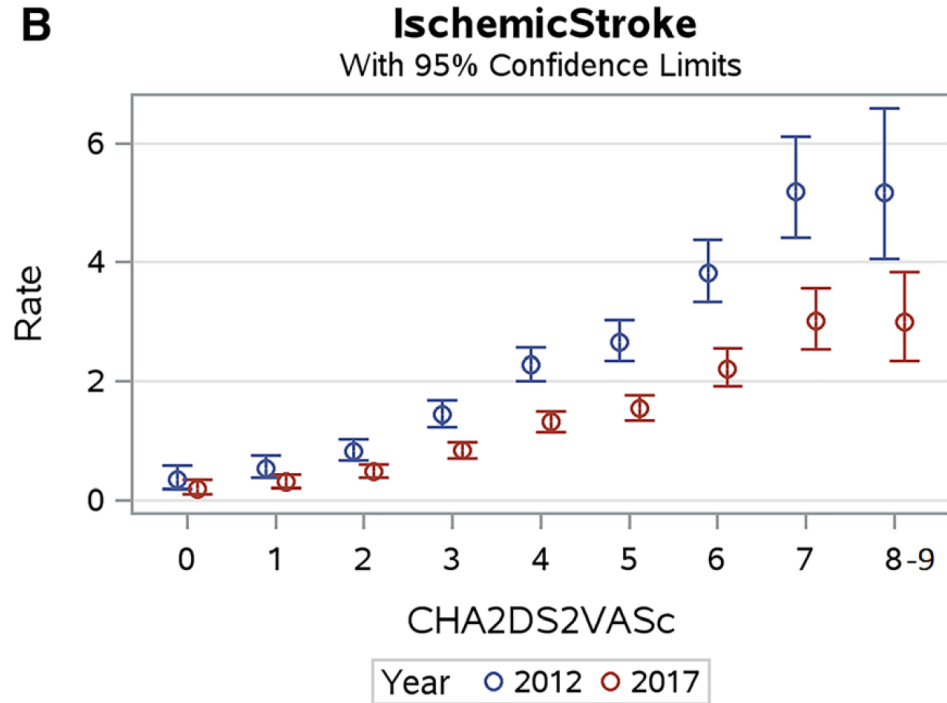
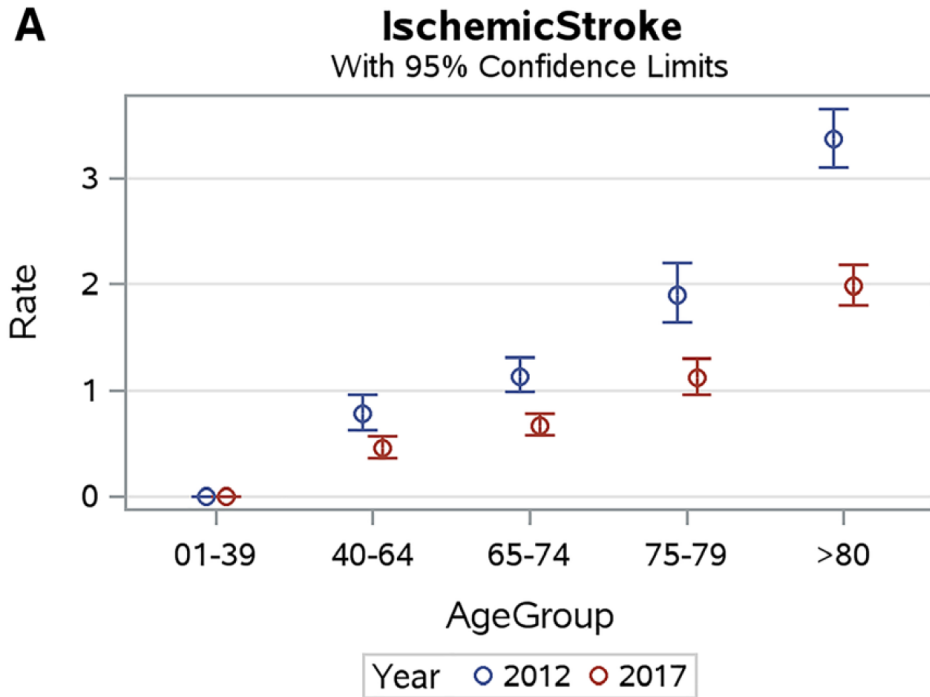
- **Type of ICH**
 - Spontaneous: 71.7% (119)
 - Traumatic: 28.3% (47)

- **Location:**
 - Intracerebral 65% (106)
 - Subdural 26.4% (43)
 - Subarachnoid 8.6% (14)

NOAC uptake in Stockholm 2012 – 2016

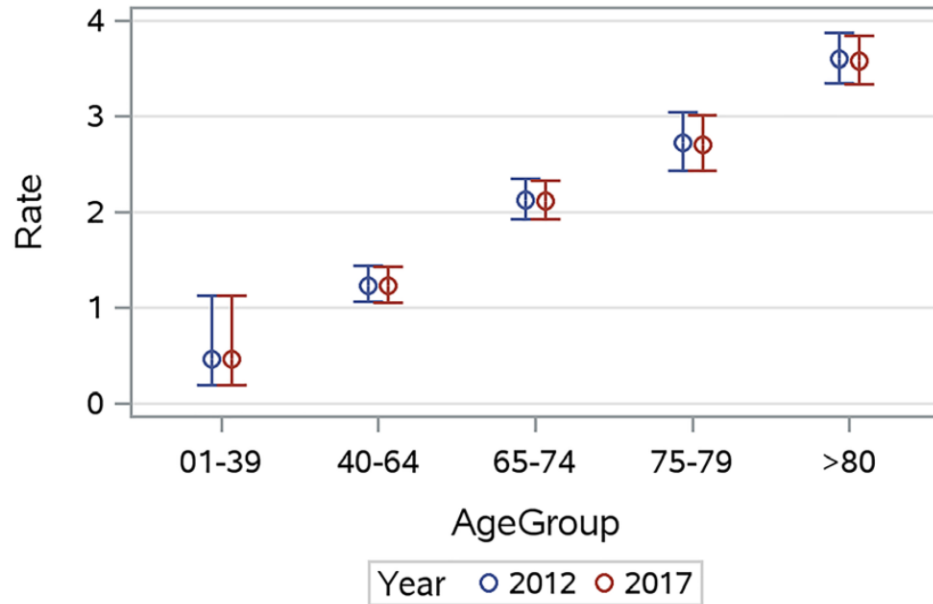


Rate of Ischemic stroke 2012 vs 2017

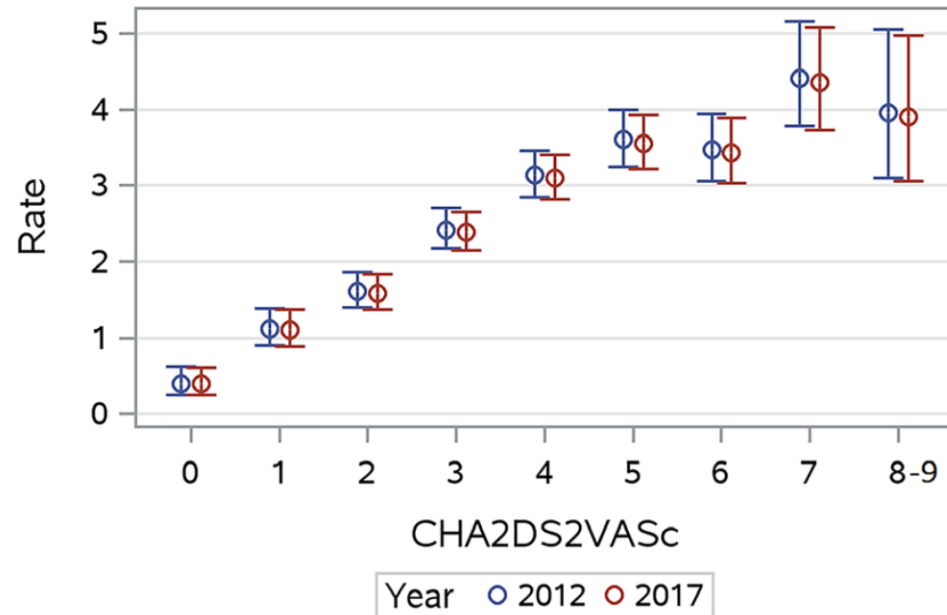


Rate of Ischemic stroke 2012 vs 2017

SevereBleed
With 95% Confidence Limits



SevereBleed
With 95% Confidence Limits



Take Home Message

- Differenzierter Einsatz der "Spitzenmedizin" im Alter unabdingbar
- Cave aber: "Behandlungsträgheit"
- Nichts tun heisst nicht zwangsläufig, das niedrigste Risiko einzugehen
 - Antikoagulation
 - Ablationen & Implantationen
 - Koronar- und Klappeninterventionen
- **Ehrliches "Shared decision making" !**