

## MP2-17

### Multiple different metal stents in the RVOT : is electrolysis a threat ?

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Introduction : Different metals in close physical contact lead to electrolysis and corrosion; this may downsize the strength and durability of the stents. Lack of data precluded pre-stenting in several trials by FDA.

Methods : Stents used in the analysis: Cheatham-Platinum (Pt-Ir-Au), Andrastent (Co-Cr), Optimus (Co-Cr), Sapien (SS316L) SapienXt (Co-Cr). All tests performed in saline Plasmalyte AKE0324 at 37°C. At the end of each test visual and stereomicroscopic investigation was performed to type the corrosion as severity.

1/galvanic corrosion test: open circuit corrosion potential (OCP) was determined against an Ag/AgCl reference electrode (exposed surface 1.5 cm<sup>2</sup>). The samples are coupled to each other. The galvanic zero resistance amperometry current and the mixed potential are measured for 1 hour after contact, 1, 2 and 4 weeks.

2/Exposition corrosion test: couples Andrastent (Co-Cr) + CP stent (Pt-Ir-Au) and Optimus stent (Co-Cr) + CP stent (Pt-Ir-Au) were tested for 3 months. Round test samples with both stents folded in each other resulting in a direct galvanic connection. Visual and stereo microscopic investigation; weight decrease analysis (uniform corrosion rate).

3/Electrochemical cyclic polarization tests : measurement of the open circuit corrosion potential after an equilibration period of 16 hours; repeated measures for 3 months. A cyclic polarization gives a polarization scan : measured current in relation to the applied anodic and cathodic over-potential.

Results : 1/couples CP-Andrastent, Andra-Sapien and Andra-SapienXT have lowest galvanic corrosion rates (0.000001 mm/year), resulting in material loss of 10 µg/year. The couples CP-Sapien and CP-SapienXT have a higher corrosion rate (0.000003 mm/year) resulting in material losses of respectively 17 and 24 µg/year. 2/No signs of corrosion could be observed on both materials of the couple Andrastent + CP stent. 3/The calculated corrosion rate of expanded and non-expanded Andrastent based on Tafel slope analysis was estimated as ~0.00002 mm/year

Conclusion : The corrosion rate and material loss of all tested materials is extremely low. No mechanical integrity problems are expected: after 100 years only 0.3% of the initial diameter of the wires of a stent will be lost as a consequence of corrosion.