An Analysis of 460 Pace Makers Explanted Post-Mortem During 2000/2001

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The functional state of pace makers (PM) and their possible involvement in the death of patients was examined in a cross-section analysis of all cases seen in the crematorium Hamburg-Öjendorf, Germany, during the years 2000/2001.

Materials and methods:
218 bodies were examined in the years 2000/2001 as part of the regular autopsy routine before cremation in the crematorium Hamburg-Öjendorf. Post-mortem alterations affecting the functionality of implantable cardioverter/defibrillators (ICD) as well as implantable cardioverter (ICD) devices were documented.

All generators were examined as to the quality of the electrical output pulses. The generators were telemetrically interrogated in all cases were possible (Batterieverordnung BattV).

The statistical analysis was performed using SPSS Version 11.0.

Results:

- Mean duration of implantation: 4.0±1.3 years (Diag. 1).
- Age of the patients at generator implantation: 80±9.5 years (Diag. 2).
- Gender distribution (457 of 460):
  - 239 female (52.3%)
  - 219 male (47.7%)
  - 3 (0.3%) undetermined
  - 35 (7.6%) EOL (end of life)
  - 71 (15.4%) ERI (elective replacement indicator)
  - 343 (74.6%) fully functional

- Functional state of the electrode system has to be assessed as well.
- All newer generators with a short duration of implantation worked flawlessly, with one exception.
- PM/ICD checks (max. 2859 days without follow-up).
- The implantation dates could only be reconstructed in cases with a short duration of implantation.

Conclusions:

- The cause of death has to be examined very thoroughly in cases with a short duration of implantation.
- The PMICD generators have to be telemetrically interrogated in order to clarify the role of the PMICD system with regard to the death of the patient.
- The importance of sequential follow-up checks of the PMICD system (generator and electrodes) has to be computed in all present and future years.

The complete study can be downloaded from the internet at:
http://www.DrJunge.de

Diagramme 8 und 9:
Sunflower-Plot (Diagram 8) of the life expectancy of a statistically normal person of the same age and gender as the pace maker patient in the year of implantation, compared to the observed duration of implantation.

The diagonal line marks the points in the diagram where the expected years at the age of implantation is equal to the observed years lived by the patient. All data points below the diagonal line mark cases where the duration of implantation was longer than the life expectancy of the normal population at the age of implantation. Meaning that the PMICD patients lived longer than the possibly healthy normal population. All data points above the diagonal line mark cases where the duration of implantation was shorter than the life expectancy of the normal population at the age of implantation. Meaning that the PMICD patients lived shorter than the possibly healthy normal population.

Scatter Plot (Diagram 9) of the functional pace maker generator state after expiration in relation to the duration of implantation and the life expectancy at the time of implantation.