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Arrhythmias

TRENDS IN PERMANENT PACEMAKER IMPLANTATION IN THE UNITED STATES 1993-2009: INCREASING COMPLEXITY OF PATIENTS AND PROCEDURES

ACC Moderated Poster Contributions

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Background: The Medicare National Coverage Determination for cardiac pacemakers (PM) has not changed since 1985. This may not be in line with contemporary medical practice. We sought to define the trends in PM utilization by analyzing a large national database.

Methods: We queried the Nationwide Inpatient Sample (NIS) to identify PM implants between 1993-2009 using the ICD-9-CM procedure codes for dual chamber (DDD) PM (37.83), single ventricular (VVI) PM (37.81-82+37.71), single atrial (AAI) PM (37.81-82+37.73) or bi-ventricular (BiV) PM (00.51). The annual NIS is a statistically valid survey of ~1000 U.S. hospitals and contains ~20% of hospitalizations regardless of payment source. Annual PM implantation rates and patient (pt) demographics were analyzed over time. Trends were also analyzed in those with sick sinus syndrome (SSS) using codes 427.8 and 426.6.

Results: Between 1993-2009, 2.9 million pts received PM in the U.S. Overall utilization increased by 55.6% (1993: 46.7/100,000 to 2009: 61.6/100,000). DDD PM increased annually from 29.1/100,000 to 50.4/100,000 ($p<0.0001$) while VVI PM decreased from 17.2/100,000 to 8.7/100,000 ($p=0.01$). By 2009, percent DDD increased from 62% to 82% ($p<0.001$) while VVI fell from 36 to 14% ($p=0.01$). AAI remained at 1% while BiV increased to 4% in 2009 (post 2001). Utilization of DDD was higher in urban, nonteaching (79%) as compared to urban, teaching (76%) and rural hospitals (72%). Pts with private insurance (83%) more commonly received DDD than Medicaid (79%) or Medicare (75%) pts ($p<0.001$). Trends were similar in those with SSS. Age of PM pts increased over time ($p<0.001$ for DDD; VVI). VVI were older than DDD pts (80 vs 75 yrs) ($p<0.001$). Charlson Co-morbidity Index (CCI) increased over time. By 2009, 45% VVI and 42% DDD had CCI>2 and 25% had renal failure. Hospital charges (\$2011) increased 45.3% (\$53,693 in 1993 to \$78,015 in 2009) driven by the increased cost of DDD.

Conclusions: There is a steady growth in the utilization of PM in the U.S. DDD PM are increasing while VVI PM are decreasing. These trends are present in all sub-groups including SSS. PM pts are getting older with more medical co-morbidities. These trends have important implications for health care policy.