LONG TERM FOLLOW-UP DATA AND DURABLE OUTCOMES WITH AN INFRARENAL PROSTHESIS

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Disclosure

DIMITRIJ KUHELJ

I have the following potential conflicts of interest to report:

☐ Consulting
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☐ Other(s)

☒ I do not have any potential conflict of interest
HISTORY - SLOVENIA- UMC LJUBLJANA

• First PTA 1978*(1 year after Grunzig)

• First PTCA 1980 **

• First selfexpanding stent in 1989***

• First aortic stent graft in UMCL- May 1998

Statistics 2019/2020/2021/2022

128 / 92/ 103/ 102 T/EVAR


UMC LJUBLJANA - providing optimal solutions for our patients

• *Education and learning*

• *R&D*

• *Patients‘ follow up, data gathering, proces optimisation*
Risk of deterministic effects during endovascular aortic stent graft implantation

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ABSTRACT. Since the 1990s, stent graft implantation for aortic pathology has become an alternative to extensive surgical procedures in some patients. Indeed, many patients with such pathology are now treated endovascularly. Only limited data concerning the risk of a deterministic effect during aortic stent graft implantation are available. Accordingly, 179 consecutive patients treated in our institute between October 2002 and July 2008 with endovascular aortic stent grafts were included in this study. Dosimetric data (kerma area product (KAP) and cumulative dose at interventional reference point (CD_{irp})) from X-ray reports were analysed for 172 patients. On a group of 19 patients, GAFCHROME XR TYPE dosimetric films were also used to verify the automatic measurements. Readings from the integrated KAP meter were found to be too high and were therefore corrected — KAP to dose area product (DAP) and CD_{irp} to entrance skin dose (ESD). Median DAP was 153 Gy.cm\(^2\) (35–700 Gy.cm\(^2\)) and median ESD was 0.44 Gy (0.12–2.73 Gy). Recorded dosimetric quantities were found to be good predictors of the skin dose, and highlighted 4 patients (2.3%) who received skin doses that might cause possible deterministic effects. Endovascular stent graft implantation is less invasive than a surgical procedure and is widely used; mid-term results are...
DIGITAL TECHNOLOGY

Dose reduction up to 25%

Measurements during 6 mts

- Doses above 6 Gy (analogue machine under 3 Gy)

- 3 Gy exceeded in 26% pts (analogue 2,3% pts 2-3 Gy)
INTERVENTIONAL RADIOLOGICAL PROCEDURES MOST PRONE TO CAUSE HIGH PATIENT PEAK SKIN DOSES BASED ON REVIEW OF 7607 PROCEDURES

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Peak skin doses to patients undergoing interventional radiological procedures in a 3-year period were assessed to identify the most critical procedures and evaluate probability for occurrence of radiation-induced tissue injuries. Data of 7607 patients were reviewed, identifying those with cumulative air kerma at a reference point ($K_{er}$) exceeding 3 Gy. Observed tissue injuries in patients with exceeded levels were gathered by a questionnaire. $K_{er}$ exceeded 3 Gy in 145 patients, all during vascular procedures; most frequently in preparations for liver radioembolization (SIRT), transjugular intrahepatic portosystemic shunt (TIPS), endovascular abdominal aortic repair (EVAR), adrenal venous sampling (AVS), endovascular thoracic aortic repair (TEVAR) and embolizations in abdominal/pelvic area (30, 21.4, 13.4, 12.6, 9.6 and 3.5% of patients, respectively). A total of 10 patients, extrapolating to ~0.6% of all patients, reported tissue injuries. During interventional radiological procedures threshold for radiation-induces tissue injuries can be exceeded in a significant number of patients (1.9%). Tissue injuries were reported approximately three times less frequently than anticipated; their severity was poorly related to those expected.
EVAR- Minimal invasiveness

In favourable clinical conditions majority of the patients may be treated completely percutaneous (with surgical back-up)
Haemostasis for 568 large femoral artery access sites – outcomes and predictors of success

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Summary

Background: The introduction of stent grafts for thoracic and abdominal aorta (T/EVAR) has raised the demand for percutaneous closure devices for larger femoral arterial access sites. The aim of our study was to evaluate the success and complication rate of completely percutaneous T/EVAR with Prostar XL® and surgical haemostasis over a 50-month period.

Patients and methods: Between December 16th 2005 and February 17th 2010 T/EVAR was performed in 306 patients with 568 arterial access sites with diameters of 12 to 24 Fr. The exclusion criteria for percutaneous haemostasis were a calcified anterior wall at the puncture site and/or a stenotic common femoral artery, seen on computed tomographic angiography.

Results: Surgical haemostasis was performed in 184 (32.4 %, o-T/EVAR group) while percutaneous haemostasis was attempted at 384 sites (67.6 %, p-T/EVAR group). Most of the procedures were elective; five of twelve emergency patients had percutaneous haemostasis that was successful in all. Percutaneous haemostasis failed at 23 sites. No data about follow-up was recorded for 54 sites (9.5 %). The technical success rate of percutaneous haemostasis was 93.6 % (338/361 sites). A larger size of the access site resulted in significantly more difficult access site preparation.

Zusammenfassung

Blutstillung nach 568 Arterienoperationen – Ergebnisse und Erfolgsprädiktoren


Ergebnisse: Chirurgische Hämostase wurde in 184 Patienten (32.4 %, o-T/EVAR Gruppe) durchgeführt, während eine perkutane Hämostase an 384 Einstichstellen (67.6 %, p-T/EVAR Gruppe) versucht wurde. Die meisten Interventionen waren elektiv; fünf von zwölf Notfallpatienten hatten eine perkutane Hämostase, in sieben Fällen erfolgte ein chirurgischer Eingriff.
EVAR- Complications

Majority of complications may be resolved by IR
Brief Report

Stent graft implantation in an aortic pseudoaneurysm associated with a fractured Cheatham-Platinum stent in aortic coarctation

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Abstract We report a case of aortic pseudoaneurysm associated with a fractured bare Cheatham-Platinum stent following stenting for aortic coarctation. These complications were recognised 6 years after the implantation procedure and were successfully managed by percutaneous stent graft implantation. Staged approach for stent dilatation might prevent development of aortic pseudoaneurysms. In addition, careful follow-up is warranted after stenting for aortic coarctation, particularly in patients with recognised aortic wall injury.

Keywords: Aortic pseudoaneurysm; stent fracture; covered stent

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Access From Above—Bailout Solution for Intraoperative Distal Migration of Abdominal Aortic Stent Graft

Dimitrij Kuhelj, MD, PhD¹, Jernej Avsenik, MD¹, and Dašmir Nuredini, MD¹

Abstract
The majority of the ruptured abdominal aortic aneurysms today is treated endovascularly. In cases with short aneurysm neck, chimney technique can be used to extend landing zone in emergency setting. Additionally, the repositioning ability of C3 delivery system (Gore & Associates) allows better positioning in cases with challenging anatomy. In our experience, proximal reposition of partially deployed device can be problematic in some patients. We present a case of endovascular repair of ruptured abdominal aortic aneurysm using chimney technique where proximal reposition was achieved by snaring the aortic device via axillary access.

Keywords
abdominal aortic stent graft, abdominal aortic aneurysm repair, EVAR
Long-term data

M&M

- 155 consecutive patients with EVAR between Oct 2002 and June 2008
- 123 Excluder (W.L. Gore & ass; Flagstaff, AZ, ZDA)
- 103 male, average age 73 years (51-89)
- Data gathering concluded Jan 2021
- SPSS v.22

### Comorbidities

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>Number of patients</th>
</tr>
</thead>
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<tr>
<td>Hypertension</td>
<td>103 (83.7%)</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>70 (56.9%)</td>
</tr>
<tr>
<td>History of smoking</td>
<td>57 (46.3%)</td>
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<tr>
<td>PAOD</td>
<td>32 (26.0%)</td>
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<tr>
<td>History of MI</td>
<td>17 (13.8%)</td>
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<tr>
<td>Diabetes mellitus</td>
<td>16 (13.0%)</td>
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<tr>
<td>Carotid disease</td>
<td>11 (8.9%)</td>
</tr>
<tr>
<td>History of CABG</td>
<td>9 (7.3%)</td>
</tr>
<tr>
<td>History of CVI/TIA</td>
<td>6 (4.9%)</td>
</tr>
</tbody>
</table>

Long-term data

Results

- Average follow-up 9.7 years
- Primary technical success 98.4%
- Average hospitalisation 4.3 days; elevated inflammatory parameters 3.8 (10.6% pts)
- Hematoma on puncture site 9.8% pts
- Complete percutaneous hemostasis 76.4%

Long-term data

Results

- 30-day mortality 0.8%
- All over survival (1, 5, 10, 15, 17 years): 94.3, 74.0, 47.2, 35.8, 35.8%
- Aortic-related survival (1, 5, 10, 15, 17 years): 98.4, 96.3, 92.6, 92.6, 92.6%
- Causes of death: CV diseases (23.6%), malignancy (20.3%), infections (6.5%), respiratory causes (5.7%), trauma (2.4%)…

Long-term data

Results

• 7 pts aortic rupture (5.7%); 2-117.4 mts after EVAR (6/7 non compliant to follow-up)

• Complications- EL- 35 pts (28.4%); 24 pts type II

• Additional procedures- 29 pts (extensions, aneurysmal embolisations, limb occlusions…)

• Open surgery- 7 pts (infections, hemicolecotomy, thrombectomy…)

<table>
<thead>
<tr>
<th>Type of treatment</th>
<th>Number of patients treated</th>
<th>Time from EVAR to treatment (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interventional procedure</td>
<td></td>
<td></td>
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<tr>
<td>stent graft extension</td>
<td>14 (11,4 %)</td>
<td>31,8 ± 35,7</td>
</tr>
<tr>
<td>translumbar sac embolisation</td>
<td>13 (10,6 %)</td>
<td>60,2 ± 35,6</td>
</tr>
<tr>
<td>thrombolysis of iliac limb</td>
<td>3 (2,4 %)</td>
<td>1,9 ± 1,4</td>
</tr>
<tr>
<td>Surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 aortobifemoral bypass</td>
<td>7 (5,7 %)</td>
<td>48,5 ± 47,9</td>
</tr>
<tr>
<td>1 thrombectomy</td>
<td>2 hemicolecotomy</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

• Endovascular management of aorta proved safe and durable
• Deterministic thresholds may be exceeded
• Long-term follow up is mandatory (late ruptures, patients compliance!)
• Minimally invasive- a vast majority of PTS may be treated completely percutaneous (with surgical back-up)
• Most complications could be solved by IR
Thank you for attention!