Diagnosis and Surgical Treatment of Nutcracker Syndrome: A Single-Center Experience

Conclusion: Left renal vein transposition is an efficient surgical treat-
ment for nutcracker syndrome. In some cases however pelvic pain remains
following left renal vein transposition.

Summary: The nutcracker syndrome is an unusual problem where
the left renal vein is narrowed as it passes between an angle formed
between the abdominal aorta and the superior mesenteric artery. This
narrowing can cause increased venous pressure within the renal
vascular system and can lead to increased venous pressure
within the renal circulation and promote development of varices of the
renal pelvis and ureter with resulting hematuria. Other symptoms asso-
ciated with nutcracker syndrome include orthostatic proteinuria, flank
pain, left-sided varicocele, pelvic congestion, and chronic fatigue. The
authors retrospectively reviewed 23 patients with the diagnosis of nut-
cracker syndrome treated at their institution from July 1998 to July
2007. Nutcracker syndrome was suspected based on the combination of
clinical examination, ultrasound, CT imaging, and MRI imaging. Hema-
turia was the most common presenting symptom (21 of 23 patients). One
patient presented with orthostatic proteinuria and 1 with pelvic conges-
tion syndrome. No patient had renal function deterioration and 13 of 23
underwent transposition of the left renal vein with the indication of
transposition being recurrent gross hematuria in 6 patients and
persistent orthostatic proteinuria in 1 patient. Sixteen patients who had
more mild symptoms were followed without operation. Patients with
microscopic hematuria or intermittent short periods of painless gross
hematuria were followed closely without treatment. Patients with flank
or abdominal pain were treated with low-dose aspirin treatment. Four
women with pelvic congestion syndrome were treated with medroxypro-
gesterone acetate.

Patients undergoing left renal vein transposition did so through a
mid-line abdominal incision with mobilization of the left colon and small
bowel to gain access to the retroperitoneum. The inferior adrenal vein,
evian/testicular vein, and the lumbar vein draining into the left renal vein
were ligated and transected. The left renal vein was excised with the small
ring of Teflon felt the vein was sutured with hepatico-venous anastomosis was then
placed between the renal vein and the vena cava forming a more caudal portion of the inferior vena cava. All 7 patients treated with
renal vein transposition had normal pre-operative creatinine levels with no
increase following renal vein transposition. Hematuria and proteinuria
ceased spontaneously 5 to 14 days following surgery with no clinical relapses.
Of the 16 patients treated conservatively, clinical improvement occurred in
11 with total relief of symptoms in 2 patients and partial relief in 9 patients.
There was no relief of symptoms in 5 patients following a mean follow-up of
41.2 months.

Comment: The pressure gradient between the left renal vein near the
renal hilum is normally between 0 and 1 mmHg (J Urology 1982; 127:
1070-1071). An elevated gradient of more than 3 mmHg between the left
renal vein and the vena cava is used as a criteria to diagnose nutcracker
syndrome. All patients in this series had such a gradient. The study indicates
that left renal vein transposition works well to alleviate symptoms in patients
with nutcracker syndrome and elevated renal vein IVC pressure gradients.
Equally important is that patients with mild symptoms do well treated
conservatively. It would appear reasonable to reserve surgical treatment of
nutcracker syndrome to those patients with recurrent gross hematuria or
persistent orthostatic proteinuria who are not responsive to conservative
management. The authors also point out that children and adolescents
should be avoided.

Endovascular Treatment of Type B Aortic Dissection: The Challenge of Late Success

Conclusions: Following endovascular thoracic aortic repair, patients
with both acute and chronic type B aortic dissections have excellent initial
results. Frequent need for new interventions leads to a steady decline in
event-free survival rates, but overall survival curves are comparable in pa-
 Patients with type B dissection undergoing less complex surgical or medical
treatment.

Summary: There is a trend towards liberalization of the use of TEVAR
for treatment of type B aortic dissection.

Exposure to Low-Dose Ionizing Radiation from Medical Imaging Procedures

Conclusion: Medical imaging procedures are an important source of
exposure to ionizing radiation. They can result in high cumulative effective
doses of radiation.

Summary: Experimental and epidemiologic evidence link exposure to
low-dose ionizing radiation with the development of both leukemia and
solid cancers (National Research Council, Health Risks from Exposure to Low-
Levels of Ionizing Radiation Beir VII Phase 2 Washington D.C. National Academies Press 2006). Individuals at risk for repeated radiation exposure such as workers in the nuclear and healthcare industry are
monitored for radiation dose and restricted to effective dose of 0.1 mSv every
5 years with a maximum of 50 mSv allowed in any given year. There is,
however, little monitoring of cumulative radiation doses for those undergo-
ing medical imaging procedures. In this study, the authors analyze recent
data on the use of imaging from 5 healthcare markets across the United
States to estimate total effective dose of radiation from medical imaging
procedures. They identified 952,420 non-elderly adults (between 18-84
years of age) in the 5 healthcare markets between January 1, 2005 and
December 31, 2007. They used utilization data to estimate cumulative
effective doses of radiation for imaging procedures. Population-based rates
of exposure were calculated. The author’s defined annual effective radiation
dose as low when the dose was < 3 mSv. Moderate-doses were defined as
between 3 and 20 mSv and high-doses as 20 to 50 mSv with very high-doses
> 50 mSv.

During the study period 68.8% of the identified adults (n=655,613)
underwent at least 1 imaging procedure involving radiation exposure. Mean
cumulative effective radiation dosedaveraged 3.2 mSv and maximum average
dose was 7.0 mSv per person per year. Moderate effective doses of radiation were
incurred in 193.8 enrollees per 1,000 person years whereas high and very-high
doses were incurred in 18.6 and 1.9 enrollees per 1,000 person per year respectively.
Advancing age and female sex were associated with increased cumulative
and effective radiation doses. CT scanning and nuclear imaging accounted for
75.4% of cumulative effective doses and 81.8% of the total administrative radiation
dose was administered in an outpatient setting.

Comment: A CT angiogram of the chest results in an average effective
dose of 15 mSv while plain CTs of the chest, abdomen, or pelvis average
approximately 7 mSv. A single CTA of the abdomen and pelvis in patient
with an aortic stent graft per year immediately places that patient into the
moderate annual effective dose of radiation. One additional CT scan will

Abstracts
Gregory L. Moneta, MD, Section Editor

1526