of running a primary PCI program 24 hours a day [Knot J et al. *EuroIntervention* 2009]. There is also a critical need for education of the general population regarding ACS and more training for healthcare providers.

Prof. Gamra's concluded with the observation that in patients with STEMI, thrombolysis is effective if initiated soon after the onset of symptoms but primary PCI is the preferred method of revascularization.

New Thinking for the Management of Acute Interventions

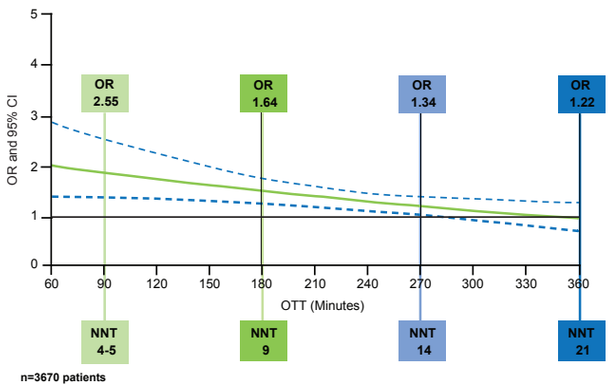
Written by **Maria Vinall**

Horst Sievert, MD, CardioVascular Center Frankfurt, Frankfurt, Germany, discussed new data which may change the management of patients with acute stroke. He noted that there is often a long time interval between the onset of stroke and treatment. In addition, current transfer systems for getting patients to hospital or catheterization laboratories in order to undergo treatment are poorly developed. Finally, current therapies are limited.

The amount time in which the brain is without blood flow impacts the severity of the stroke and potential for recovery. There is often a considerable delay from the time in which patients first develop symptoms to the time in which they seek treatment. Efforts must be made to educate patients about the early signs of transient ischemic attack (TIA)/stroke and the need to quickly seek medical care when these symptoms occur. The time to treatment may also be improved by using ambulances specifically designed for transporting stroke patients. It may also be possible to reduce the amount of time needed to make the diagnosis of a stroke by utilizing mobile computed tomography (CT) scanners or bypassing the Emergency Department and taking patients directly to imaging. Providers could then take a history can be taken, perform lab tests, and ready the patient for thrombolysis while the patient is preparing to undergo imaging.

Expediting the treatment of patients with thrombolysis is important since data from a pooled analysis of early administration of recombinant tissue plasminogen activator (rtPA) after ischemic stroke showed benefit out to 4.5 hours after stroke onset. After 4.5 hours, the risk of thrombolysis may outweigh its potential benefits (Figure 1) [Lees KR et al. *Lancet* 2010].

Figure 1. Pooled Analysis rtPA for Acute Ischemic Stroke: Favorable Outcome (mRS 0-1) Versus Time



Reproduced from Lees KR et al. Time to treatment with intravenous alteplase and outcome in stroke: an updated pooled analysis of ECASS, ATLANTIS, NINDS, and EPITHET trials. *Lancet* 2010;375(9727):1695-1703. With permission from Elsevier.

Thrombolysis improves outcomes in patients with acute ischemic stroke; however, the success of thrombolysis for the recanalization of large clots is poor (~10% success) and reocclusion occurs in ~20% of patients who initially have successful reperfusion. The use of angiography allows for better localization of the occlusion and allows for direct administration of thrombolytics to thrombus. In addition, mechanical thrombectomy devices can be used to obtain immediate reperfusion.

Although thrombolysis is still the gold standard therapy for acute stroke, more centers are developing clinical pathways based on severity, duration of symptoms, and the use of catheter intervention. Data from the PROACT-II study [Furlan A et al. *JAMA* 1999], IMS II trial [IMS Trial Investigators. *Stroke* 2007], and RECANLISE registry [Sen S et al. *Neurocrit Care* 2009], support the use of a catheter invention approach; however, recent data show no benefit from mechanical lysis compared with IV tPA (IMS III [Broderick JP et al. *N Engl J Med* 2013], SYNTHESIS [Ciccone A et al. *N Engl J Med* 2013], and MR Rescue [Kidwell CS et al. *N Engl J Med* 2013]). As a result, the optimal treatment for patients with ischemic stroke remains undefined.

Prof. Sievert proposed an algorithm to guide treatment selection based on time since symptom onset (Table 1).

Table 1. Treatment Algorithm

Time of Symptom Onset	Treatment
<4.5 hours	
NIHSS score <10	IV tPA
NIHSS score >10	IA lysis/mechanical
4.5 to 6 hours	IA lysis /mechanical
>6 hours	IA lysis guided by perfusion imaging

IA=intra-arterial; IV=intravenous; NIHSS=National Institutes of Health Stroke Scale; tPA=tissue plasminogen activator.

Under multisociety consensus quality improvement guidelines [Sacks D et al. *Catheter Cardiovasc Interv* 2013], patients with the following characteristic benefit the most from mechanical recanalization:

- Patients in whom IV tPA is contraindicated or in whom IV tPA has failed or is likely to fail
- Patients with large vessel occlusion
- Very symptomatic patients
- Patients with a stroke time window out to 8 hours
- Patients with a proximal artery occlusion

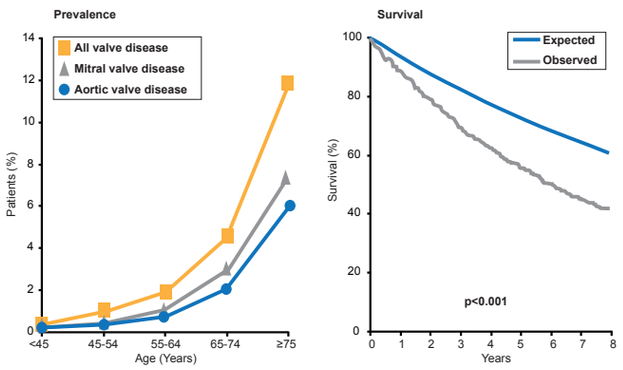
"There is only one effective treatment for ischemic stroke," said Prof. Sievert, "to get the vessel open."

Updated Guidelines for Valvular Heart Disease

Written by Maria Vinall

Valvular heart disease is not usually regarded as a major public health problem. However, the prevalence of both mitral and aortic valve disease is increasing and is particularly troublesome for individuals aged ≥75 years (Figure 1) [Nkomo VT et al. *Lancet* 2006].

Figure 1. Burden of Valve Disease



Reproduced from Nkomo VE et al. Burden of valvular heart diseases: a population-based study. *Lancet* 2006;368(9540):1005-1011. With permission from Elsevier.

European Society of Cardiology (ESC)/European Association for Cardio-Thoracic Surgery (EACTS) Guidelines on the management of valvular heart disease were updated in 2012 [Vahanian A et al. *Eur Heart J* 2012; *Eur J Cardiothorac Surg* 2012]. Fausto J. Pinto, MD, PhD, University of Lison, Lisbon, Portugal, discussed some of the major changes that resulted from new evidence regarding risk stratification, diagnostic methods, and therapeutic options.

The 2012 guidelines recommend that treatment decisions for patients with valvular heart disease be made by a "heart team" comprised of cardiologists, cardiac surgeons, imaging specialists, anesthesiologists, and others, as appropriate. The decision process should focus on disease severity, patient symptoms, the relationship of the symptoms to valvular disease, life expectancy and quality of life, whether the expected benefits of intervention outweigh the risk, the patient's wishes, and whether local resources are optimal for the planned intervention.

All patients should receive a clinical assessment and echocardiography to confirm diagnosis and to assess severity and prognosis. Exercise testing, stress echocardiography, magnetic resonance imaging, and multislice computed tomography may provide additional useful information. Cardiac catherization to evaluate valve function are necessary only if noninvasive findings are inconsistent with the clinical assessment.

Table 1. Aortic Regurgitation (Class and Level of Evidence)

Severe Aortic Regurgitation
Surgery is indicated for symptomatic patients (IB), asymptomatic patients with resting LVEF ≤50% (IB), undergoing CABG or surgery of ascending aorta (IC), and for asymptomatic patients with resting LVEF >50% with severe LV dilation (IIaC)
Surgery should be considered in asymptomatic patients with resting EF >50% with severe LV dilatation: LVEDD >70 mm, or LVESD >50 mm or LVESD >25 mm/m^2 BSA
Aortic Root Disease (regardless of aortic regurgitation severity)
Surgery is indicated for patients with maximal ascending aortic diameter ≥50 mm for patients with Marfan syndrome (IC)
Surgery should be considered for patients who have aortic root disease with maximal ascending aortic diameter: ≥45 mm for patients with Marfan syndrome with risk factors, ≥50 mm for patients with bicuspid valve with risk factors, or ≥55 mm for other patients (IIaC)

AR=aortic regurgitation; BSA=body surface area; CABG=coronary artery bypass graft; EF=ejection fraction; LV=left ventricular; LVEDD=LV end diastolic diameter; LVESD=LV end systolic diameter.

*Risk factors include family history of aortic dissection and/or aortic size increase 0.2 mm/year (on repeated measurements using the same imaging technique, measured at the same aorta level with side-by-side comparison and confirmed by another technique), severe AR or mitral regurgitation, desire of pregnancy.

Table 2. Aortic Valve Replacement (Class and Level of Evidence)

Symptomatic Aortic Stenosis
Aortic Valve Replacement is indicated in patients with severe AS and any symptoms related to AS (IB), and in patients with severe AS undergoing CABG or surgery of the ascending aorta or another valve (IC)
AVR should be considered in patients with moderate AS undergoing CABG, surgery of the ascending aorta or another valve (IIaC), and in high-risk patients with severe symptomatic AS who are suitable for transcatheter aortic valve implantation, but in whom surgery is favored by a 'heart team' based on the individual risk profile and anatomic suitability (IIaB)
AVR should be considered in patients with low flow, low gradient (<40 mm Hg) AS with normal EF only after careful confirmation of severe AS, and in patients with severe AS, low flow, low gradient with reduced EF, and evidence of flow reserve (both IIaC)
AVR may be considered in patients with severe AS low flow, low gradient, and LV dysfunction without flow reserve (IIbC)
Asymptomatic Aortic Stenosis
AVR is indicated in patients with severe AS and systolic LV dysfunction (LVEF <50%) not due to another cause (IC), and in patients with abnormal exercise test showing symptoms on exercise clearly related to AS (IC)

AS=aortic stenosis; AVR=aortic valve replacement; BSA=body surface area; CABG=coronary artery bypass graft; EF=ejection fraction; LVEF=left ventricular ejection fraction.