Swedvasc annual report for 2016

# English summary of the annual report for Swedvasc, the Swedish national quality registry for vascular surgery.

# Introduction

The Swedish vascular registry, Swedvasc, was founded 1987 and thus celebrates it´s 30th anniversary 2017. Swedvasc was initiated as one of the first surgical national quality registries in Sweden and the first registry for vascular surgery in the world. During 2016 a new venous section was launched, including varicose veins, which have not been registered before. Improvements were also made in direct feed-back to users with the possibility to see continuous updates of results from own institution compared with national results.

Regular monitoring of Swedvasc is performed by the regional coordinators who compare the registry with medical records and data from the National Board of Health and Welfare. The patients’ perspective has been further strengthened by our two committed patient representatives, Björn Broman and Timo Söderlund, from the Aortic Dissection Association Scandinavia, webpage <http://aortadissektion.com/en/>

Below a short summary is given for each section of Swedvasc from the annual report for 2016. If you require more information regarding Swedvasc and the 2017 annual report please contact us, our e-mail addresses are found at <http://www.ucr.uu.se/swedvasc/kontakter> . The complete annual reports in Swedish are found at <http://www.ucr.uu.se/swedvasc/arsrapporter>

# Aorta

Katarina Björses and Khatereh Djavani Gidlund

In the Swedvasc, aortic surgery is recorded in two modules. An aortic aneurysm situated below the renal arteries is registered in the aortic module. Surgical treatment of aneurysms in other locations of the aorta, as well as treatment of aortic dissection, traumatic injury of the aorta and other rare aortic pathologies are registered in a separate registration module. In Sweden the prevalence of abdominal aortic aneurysms is 1.5 -2 % among 65 year old men. A total of 1134 operations were registered in 2016, 17 percent were performed in female patients with a mean age of 74 years (SD 7.5), and 83 percent men, mean age 73 years (SD 7.6). The number of registered operations for abdominal aortic aneurysms has decreased from 1390 in 2010 to 1134 in 2016.

The number of cases of ruptured aortic aneurysms decreases every year, 16% in 2016 compared to 18% in 2015. The mortality for ruptured AAA remains high. Thirty-day mortality rate for ruptured abdominal aneurysm is 28% with open repair compared to 27% with endovascular technique, ninety-day mortality 32% for open repair and 33% for endovascular repair. There were no differences in the method of operation for ruptured and intact abdominal aortic aneurysms between men and women. There are differences in the method of operation between different counties which was expected, as treatment of patients is based not only on scientific evidence, but also on the available resources, experience and traditions. It is important to highlight these differences and to discuss if the difference seen between different counties is justifiable.

Repair of thoracic, thoracoabdominal and suprarenal aneurysms is steadily increasing since 2010, 177 operations were registered in 2016. Thoracic aneurysm repairs contributed to 1/3 of the registrations and 2/3 of the repairs included the suprarenal part of aorta, and involved some, or all of the visceral arteries. The majority of patients were treated with endovascular repair (93 %). Ten percent of the aneurysms were ruptured. The 90-day mortality was high: 44 % for ruptured aneurysms, compared to 6 % for intact aneurysms (Table 1).

The number of repairs for aortic dissections has been stable, around 65-75 repairs yearly, and 70 repairs in 2016. Ninety percent of the patients with dissection were treated with endovascular technique, 47 % were classified as acute (within 2 weeks). The mortality at 90 days was 9 % for acute dissections and almost 14 % for chronic, which was similar compared to last year. There is a rather large variation between Swedish counties in the proportion of treated acute dissections, for unknown reasons (Table 1).

Table 1. Mortality for repair of thoracic, thoracoabdominal and suprarenal aneurysms and aortic dissections (Stanford type B) registered in 2015 and 2016.

|  |  |  |
| --- | --- | --- |
| **Mortality** | **2015** | **2016** |
|   |   |   |   |   |
| **Aneurysms** | **Rupture (n 30)** | **Intact (n 131)** | **Rupture (n 18)** | **Intact (n 159)** |
| 30 days | 16,70% | 6,10% | 33% | 3,80% |
| 90 days | 26,70% | 8,40% | 44,40% | 6,30% |
| 1 year | 40,00% | 18,30% | - | - |
|   |   |   |   |   |
| **Dissections** | **Acute (n 32)** | **Chronic (n 43)** | **Acute (n 33)** | **Chronic (n 37)** |
| 30 days | 6,30% | 9,30% | 6,10% | 10,80% |
| 90 days | 6,30% | 11,60% | 9,10% | 13,50% |
| 1 year | 9,40% | 20,90% | - | - |

A new aortic module is under construction, including thoracic and abdominal aorta, and will be ready for use in 2018.

# Carotid artery stenosis

Magnus Jonsson

In Sweden, 25000 people suffer a stroke every year, approximately 10% of these are caused by a carotid artery stenosis (CS). In the last decades, stroke incidence rate has fallen in Sweden like in other high-income countries. Surgical treatment of CS aims to reduce the risk of stroke.

During the last 10 years, the number of operations for CS has gradually decreased by nearly 30 %. Mainly this is due to a decrease in the number of operations for asymptomatic CS, but in the last years, also the number of patients being operated on for symptomatic stenosis has decreased. After the publication of ICSS and CREST, the number of stenting procedures decreased rapidly.

In 2016, 847 procedures for CS were performed, 92% for symptomatic stenosis, and 8% for asymptomatic stenosis. The majority were open procedures (96%) of whom 75% were conventional endarterectomies and 25% eversion endarterectomies; stenting accounted for 4% of the procedures.

The 30-day stroke or death rates were 3.3% (95% CI 2.2-4.9) for symptomatic stenosis and 0 % (95% CI 0.0-5.3) for asymptomatic stenosis.

Eighty-three per cent of the symptomatic patients were operated within 14 days from qualifying neurologic event, and median time from qualifying event to operation was 7.0 days (inter quartile range 4.5-12).

The last five years, the number of operations performed for symptomatic stenosis per 100.000 inhabitants over 60 years differed significantly between different regions in Sweden. In Dalarna, 54 operations/100.000 inhabitants >60 years were performed, which is twice as many as compared to some other regions. The difference in number of operations does not correlate to the number of strokes registered in each region. The reasons for these significant differences should be investigated.

# Peripheral Arterial Disease (PAD)

Alireza Daryapeyma and Joachim Starck

During 2016 a total of 5612 infrainguinal procedures were registered. This represents a 4% increase compared to 2015 and a 15% increase compared to 2014. To put this into perspective, population growth in the ≥ 60 (years) segment of was only 1.3% from 2015 to 2016.

The operations were carried out at 29 centres spread over Sweden’s 21 regions. Forty-four percent of the patients were female and the median age was 74 years.

The comorbidities and risk factors are relatively unchanged with hypertension (80%), diabetes mellitus (39%), ischaemic heart disease (46%), pulmonary disease (17%) and active smokers (18%).

*Indications for intervention*

The bulk of the interventions were due to chronic ischaemia (85%; n=4793), with only 15% (n=819) due to acute ischaemia. 35% of those with chronic ischaemia suffered from intermittent claudication whereas 63% had critical ischaemia with rest pain and/or ischaemic wound. The remaining 2% consisted of cases where re-interventions were carried out prophylactically.

*Regional differences*

There were no substantial differences concerning the number of operations per 100 000 inhabitants ≥ 60 years (n=214-238) among the country’s three largest regions (Stockholm, Västra Götaland and Skåne).

The two regions at the extreme ends are Södermanland with the highest number of procedures (n=315) and Örebro with the least number of procedures (n=105).

The total number of procedures performed (/100 000 inhabitants ≥ 60 years) for treating intermittent claudication in Sweden rose by 8% from 2015 to 2016. The sharpest increases were seen in Örebro (200%), Västernorrland (62%) and Kalmar (51%). In contrast, the number of these procedures dropped by 34% in Gävleborg and 36% in Östergötland.

The regions that stand out with sharp increases in the treatment of critical ischaemia are Västmanland and Uppsala with 67% and 57%, respectively, from 2015 to 2016.

The total number (/100 000 inhabitants ≥ 60 years) of procedures for acute ischaemia, for the country as a whole, was almost unchanged between 2015 and 2016. However, significant increases have been reported in Jämtland (56%), Kalmar (43%) and Västernorrland (43%). Conversely, Gävleborg and Östergötland have experienced significant decreases, 46% and 28%, respectively, during the same period.

*30-day results and postoperative complications*

Amputation-free survival after intervention for treatment of PAD on a nationwide basis was 94.7% in 2016.

Based on the reported changes in the Rutherford classification - which stratifies the severity of symptoms - patients with chronic wounds had the least proportion of improvement at 40% in contrast to patients with severe intermittent claudication with 80% improvement after 30 days.

# Popliteal aneurysms

Joachim Starck

In the Swedish vascular registry treatment for popliteal aneurysm (PA) has a separate registration module since 2014. In 2016, 176 surgical procedures for PA was performed in Sweden which is about the same for the last three years.

94% of all patients were men and the mean age was 72%. 73% had was diagnosed with or treated for a contralateral PA. Fifty-two percent % had a diagnosed aorto-iliacal aneurysm.

60% of the patients were or had been smoker. 18% were smoking at the time for surgery.

The indication for surgery is divided between aymptomatic (49%), acute ischemia (24%), chronic ischemia (14%), rupture (4%) and other (9%) including wrongly registered and venous obliteratione.

The trend towards endovascular procedures within vascular surgery as a whole is not seen in the treatment for PA in Sweden. In 2014 76 % of the surgical procedures were open and in 2016 87 % of the procedures were open. This might be influenced by recent research made on Swedish registry data.

Severe complications are low among patients treated electively; 100% amputation-free survival at 30 days. Wound complications that need some kind of intervention are more common though; near 20% at 30-days.

In 2014-2016 there are very large differences between the regions of Sweden concerning how many surgical procedures for PA per year and per 100.000 inhabitants over 60 years of age that were performed:

In Örebro county there were 2.7 (SD 0.54) operations for PA per year and 100.000 inhabitants over 60 years of age and in Västmanland county there were 13.6 (SD 4.4) procedures for PA per year and 100.000 inhabitants over 60 years of age.

Mean for the whole country was just over 6.5 (SD 0.1) procedures for PA per year and 100.000 inhabitants over 60 years of age.

# Vascular Access

Birgitta Sigvant

End stage renal disease (ESRD) is common and a growing problem and a vascular access (VA) is a key component of hemodialysis (HD). The majority of VA procedures are performed by vascular surgeons and amounted to 26% (n=2522) of all vascular procedures recorded within the registry in 2016.

According to international guidelines should 65% of all incident HD patients commence dialysis with an AV fistula(AVF) (1). During 2016 however only 34% of the patients started HD with an AVF in Sweden, with large regional differences (0%-73%).

In total were 848 primary AVF were performed, the majority of which were radiocephalic (n=453), followed by brachiocephalic (n= 192) and graft (n=181). Approximately 60% of cases were primarily well functioning, 20% were abandoned and 20% were in need of an assisting procedure.

The proportion of graft use varied between different sites, for example no grafts were implanted in Jönköping or Eskilstuna while graft amounted to 40% of VA in Stockholm during 2016.

Access complication is still common. Overall twice as many redo’s procedures (n=1674) were performed compared to primary operations. Endovascular technique was used in almost two of three cases. Thrombectomy was the most frequently open procedure, often in combination with for example PTA or a patch plastic. Modern techniques with drug eluting devices are increasingly used.

# Venous interventions

Lena Blomgren

Venous interventions have been scarcely reported previously in Swedvasc. In February 2016 a new Venous section was launched, subdivided in three parts: *Infrarenal obstruction, Varicose veins and Other venous interventions.* As the Venous section is new and also includes interventions not registered previously, it has still not reached full coverage. Some high-volume private centres for varicose veins treatment started using the registry however, and thus the number of interventions entered during the eleven months became as high as 4021.

*Infrarenal obstruction*

This part includes infrarenal venous thrombolysis and stenting. Forty-one interventions were entered: 1 open thrombectomy, 17 catheter directed thrombolysis, 3 pharmacomechanical thrombectomies and 12 venous stenting, in 10 different hospitals. The number of procedures performed is probably higher than the number entered.

*Varicose veins*

The participating centres entered 3828 interventions. The true number in Sweden is probably around 10 000. The methods used (alone or in combination) were stripping 194, SEPS 11, endovenous laser ablation (EVLA) 1991, radiofrequency ablation (RFA) 524, mechochemical ablation (MOCA) 9, phlebectomies 2419 and foam sclerotherapy in 951 cases. For treating the great saphenous vein the figures were stripping 153, EVLA 1680, RFA 442, MOCA 7 and foam sclerotherapy in 310 cases.

*Other venous interventions*

One hundred and fifty-two diverse venous interventions were registered with indications such as venous trauma 4, iatrogenic injury 8, malignancy 12, venous aneurysm 2, pelvic congestion syndrome or varicocele 41, thoracic outlet syndrome 60, thrombosis other than infrarenal (visceral, arms etc) 54 and primary deep insufficiency 2.

*Future prospects*

Information and education about the venous section of Swedvasc will be intensified, and more private clinics will be invited to participate.

# Register Based Research

Birgitta Sigvant

Quality registries make it possible to monitor health care, observe time trends and compare different units. Data can further be used for quality improvement. The register provides several tools for data collection. Apart from the on-line reports and annual reports, continuous update for selected quality indicators is available on line (“Koll-på-läget”). It is a dashboard that provides unit specific results in comparision with national outcome.

In addition to measuring quality in health care, the registry is a valuable source for research. In 2016 11 publications were based on data from Swedvasc. There is a national trend towards more register based research (Figure 1). The registry received in total 16 requests for data extraction for different research projects during 2016.

**Figure 1.**

Number of publications in peer-reviewed journals based on 69 quality registers from 2009 to 2015.





In 2014 was SWEDEPAD, a registry-based randomized clinical trial launched. A randomization module is included in the clinical registry which enables inclusion of an unselected patient cohort at a low cost. In total are 762 patients included in SWEDEPAD 1 and 414 in SWEDEPAD 2 at 21 different centers in Sweden. More information about the study is available at the home page (www.ucr.uu.se/SWEDEPAD).

# Global variations in management of vascular surgical patients

Kevin Mani

Decision making regarding surgical treatment of a patient with vascular disease is complex and involves assessment of the patient’s situation in relation to the available evidence for the patient benefitting from surgical intervention. International guidelines and consensus documents aim to summarise the existing literature regarding various clinical situations, and create guidance for clinicans. National vascular surgical quality registries offer an opportunity to assess how international guidelines are applied in clinical practice.

The Vascunet is a network of national quality registries in vascular surgery, under the umbrella of the European Society for Vascular Surgery. The Vascunet involves vascular registries from Europe, New Zealand and Australia. In a collaboration with the US-based Vascular Quality Initiative, the network recently analysed global differences in treatment of vascular surgical patients over three continents. The studies focused on patients with abdominal aortic aneurysms, and carotid artery stenosis. These studies indicate that there are large geographical differences in surgical management of vascular surgical disease. The variations in surgical management occur both in clinical areas where there are clear international guidelines (e.g. threshold for elective intervention in patients with abdominal aortic aneurysms), as well as in clinical areas where there is uncertainty regarding best practice (e.g. surgical management of patients with assymptomatic carotid artery stenosis). Treatment of patients is not only driven by the presence of scientific evidence, but also by patient preference, availability of resources as well as health care reimboursement system.