Treatment of varicose veins in Denmark

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ABSTRACT

INTRODUCTION: The aim of this study is to report the treatment of varicose veins in Denmark in the five-year period from 2007 to 2011, primarily based on reports to the nationwide Clinical Vein Database (KVD).

MATERIAL AND METHODS: The KVD collects clinical patient data before, during and after invasive treatment of varicose veins in public hospitals, private outpatient clinics and private hospitals.

RESULTS: A slight decrease was observed in the total number of treated legs from about 15,000 annually to nearly 14,000 during the period. Public hospitals and private outpatient clinics treat an almost equal number of patients, whereas private hospitals perform 3% of the treatments. The coverage rate of KVD in public hospitals has been almost complete (94%), but it has been approx. 40% in private outpatient clinics and private hospitals. In 84% of the legs, there were only subjective complaints. The remaining 16% had developed complications, i.e. eczema, varicophlebitis, ulcers or bleeding. Operations still make up the vast majority of the procedures, and although the number of endovenous procedures has increased during the period, these procedures account for only 15% of the procedures performed in 2011. Of all legs, 36% had previously been treated for varicose veins.

CONCLUSION: The literature and our results show that there has been no significant change in the number of varicose vein treatments in Denmark for the past 20 years. Endovenous procedures still account for a small number of the procedures. Despite the increased focus on the treatment of varicose veins, just as many patients are treated for recurrence as in the 1990s.

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In 1998 the Danish Health and Medicines Authority published a guideline on treatment of varicose veins [1]. It concluded that the treatment of varicose veins in Denmark was performed very heterogeneously, and that the need for retreatment was high. One of the recommendations in the guideline was to establish a clinical database for registration of the quality of treatment of varicose veins in public hospitals as well as private outpatient clinics, which are reimbursed by the public Health Insurance. In the following years, a nationwide database, the Clinical Vein Database (KVD), was therefore planned and tested both in public hospitals and in private outpatient clinics with web-based data entry to a central, publicly funded database in line with many other Danish databases. In 2006 the units treating varicose veins were connected to the KVD and started entering data, and the database was approved by the Danish Health and Medicines Authority as a nationwide clinical quality database to which reporting is mandatory. In the following, we report the treatment of varicose veins in Denmark in the five-year period from 2007 to 2011 based on data from the KVD, from the administrative Danish National Hospital Register (LPR) and from the public Health Insurance.

MATERIAL AND METHODS

Clinical patient data before, during and after invasive treatment of varicose veins were recorded in the database [2]. Data were collected from public hospitals, private outpatient clinics and private hospitals. Public and private hospitals also report their procedures to the LPR. To assess the coverage rate of the KVD, data linkage between the LPR and the KVD was established. The procedures in private outpatient clinics are not reported to the LPR, but to the Health Insurance. These data cannot be linked to data from the KVD, but the public Health Insurance in each of the five Danish administrative regions have informed us of the type and the number of procedures in each private outpatient clinic. These data were compared with the KVD data from private outpatient clinics.

In the KVD, the treatment performed on each leg was registered with one or, usually, several procedure codes listed in the Health Care Classification System (SKS codes). On the basis of these codes, the procedures were grouped as follows:

1. Great saphenous vein (GSV) operation: (Re-) operation in the groin and/or on the trunk of the GSV.
2. Small saphenous vein (SSV) operation: (Re-) operation in the popliteal fossa and/or on the trunk of the SSV.
3. GSV and SSV operation: Both of the above-mentioned groups in the same operation.
4. Perforator operation: Resection of perforator(s) in the thigh and/or the leg without surgery on GSV or SSV.

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FIGURE 1

Number of treated legs reported to the Danish National Hospital Register or to the public health insurance.

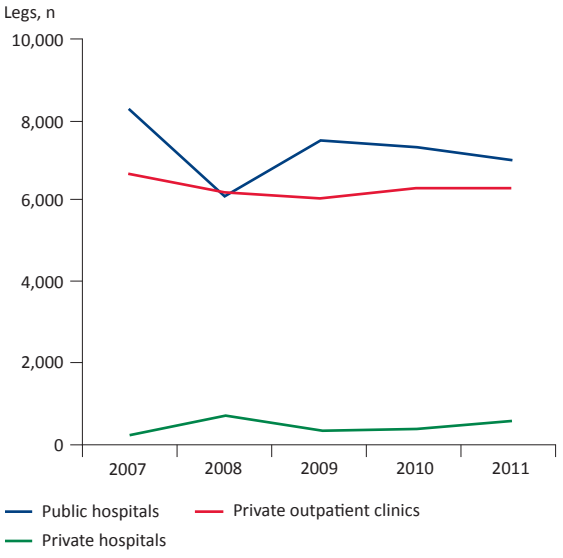
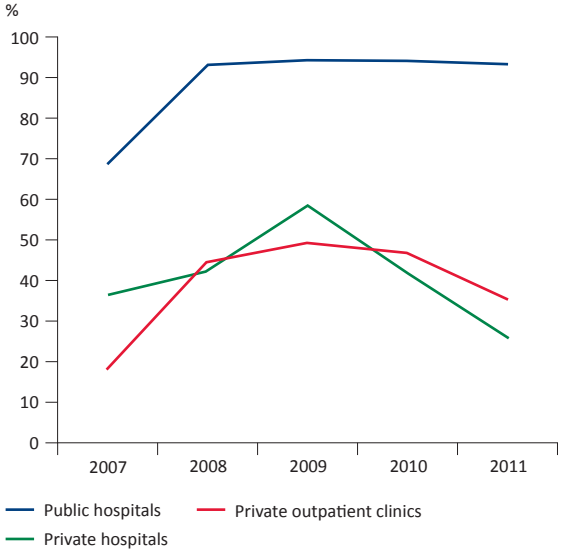


FIGURE 2

Coverage rate of Clinical Vein Database.



5. Phlebectomy: Phlebectomy and/or (foam) sclerotherapy of varicose veins without treatment of GSV, SSV or perforators.
6. Laser: Endovenous laser ablation of GSV and/or SSV, independent of whether other operations or (foam) sclerotherapy were performed.
7. Radiofrequency: Radiofrequency ablation of GSV and/or SSV, independent of whether other operations or (foam) sclerotherapy were performed.
8. Foam: Foam sclerotherapy of GSV and/or SSV, independent of whether other operations were performed.

Complications after treatment were recorded at follow-up on the basis of the following definitions:

- infection that required surgical treatment
- nerve injury with significant sensory disturbance, pain and/or paralysis
- bleeding or haematoma that required surgical treatment
- lymphocele or lymphorrhoea for more than two days
- deep vein thrombosis.

Trial registration: not relevant.

RESULTS

In the years 2007-2011, a slight decrease was observed in the total number of treated legs from about 15,000 annually to nearly 14,000 reported to the LPR and the Health Insurance. **Figure 1** shows that public hospitals and private outpatient clinics treat an almost equal number of patients. Private hospitals perform only 3% of the varicose vein procedures. During the five-year study period, the number of public hospitals which according to the LPR treated varicose veins decreased from 17 to 12. In all, 90% of the hospitals performed more than 50 procedures per year. The number of private outpatient clinics which according to Health Insurance data treat varicose veins decreased from 37 to 28 during the period. Slightly more than 50% of these clinics treated more than 50 legs per year. The number of private hospitals, which according to the LPR treated varicose veins has fluctuated around ten. Only 33% of these treated more than 50 legs per year.

In the entire five-year period, a total of 44,949 treated legs were reported to the KVD, whereas the LPR and the Health Insurance registered 70,151 legs. This corresponds to a total KVD coverage rate of 64%. It is shown in **Figure 2** that in most of the period, the coverage rate of the public hospitals was almost complete (94%), whereas it was only about 40% in private outpatient clinics and private hospitals.

Women made up 74% of the treated patients and the median age was 51 years. The symptoms that the patients had prior to treatment are shown in **Table 1**. The majority had more than one symptom. Cosmetic complaints are part of the symptoms in 27% legs, but this was the only cause of treatment in only 4% of the legs. In 84% of the legs, there were only subjective com-

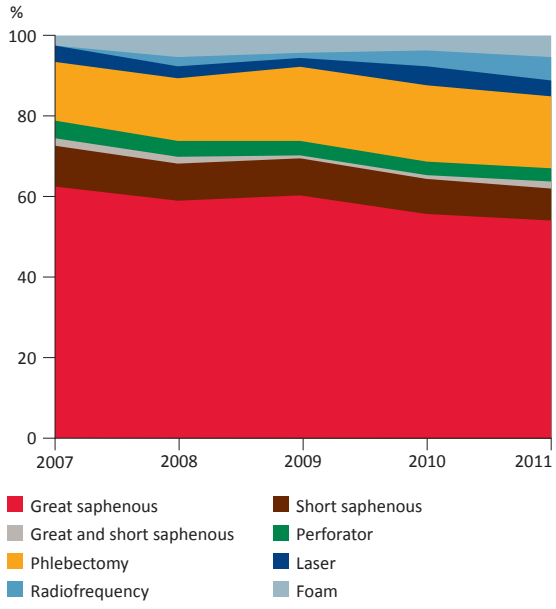
TABLE 1

Symptoms reported to Clinical Vein Database.

	Legs, n (%)	
	1 symptom	> 1 symptom
Heaviness	2,739 (6.1)	21,251 (47)
Aching	2,563 (5.7)	15,723 (35)
Swelling	900 (2.0)	16,422 (37)
Restless legs	620 (1.4)	15,001 (33)
Cosmetic	1,796 (4.0)	12,202 (27)
Itching	402 (0.9)	8,607 (19)
Cramps	291 (0.6)	6,934 (15)
Eczema	318 (0.7)	2,948 (7)
Varicophlebitis	315 (0.7)	1,717 (4)
Ulcer	309 (0.7)	1,146 (3)
Bleeding	164 (0.4)	335 (1)
Other	423 (0.9)	950 (2)
Not stated	–	883 (2)
Total	10,840 (24.1)	34,109 (76)

FIGURE 3

The relative distribution of treatments reported to Clinical Vein Database.



plaints, but 16% had developed complications of varicose veins, i.e. eczema, varicophlebitis, ulcers or bleeding. At the clinical examination, the legs were assessed by the highest class (C-Class) according to the Clinical-Etiology-Anatomy-Pathophysiology (CEAP) classification [3]. Varicose veins (C 2) were seen in 81% of the legs, whereas 5% had an oedema at the examination (C 3). In 9% there was pigmentation or eczema (C4); 1.6% had a healed venous ulcer (C5) and 1.5% an active ulcer (C6). Of the legs treated in public and private hospitals, 14% and 18%, respectively, had serious varicose vein disease with skin changes (C4-C6), while these changes were only present in 6% of legs treated in private outpatient clinics.

The relative distribution of the procedures divided into the eight groups is presented in **Figure 3**. It is seen that operations still make up the vast majority of the procedures registered in the KVD. The number of the new endovenous procedures with foam sclerotherapy, laser or radiofrequency ablation [4] increased during the period, but they amount only to 15% of the procedures in 2011 with an equal distribution between the three methods. At the same time, the number of GSV operations decreased accordingly. The endovenous procedures are primarily performed in private outpatient clinics and private hospitals, where they constitute about 25% of the procedures registered in the KVD, but the new methods account for only 5% of the procedures in public hospitals. Isolated treatment of visible varicose veins with phlebectomy and/or local (foam) sclerotherapy amounted to approximately 17% of the interventions during the whole period. But there were considerable differences between private outpatient clinics, where this treatment accounts for 33% of the interventions, and public and private hospitals where this treatment only amounts to about 10% of interventions.

In the guideline [1], it was recommended that a routine follow-up was made 3-6 months after treatment for quality control with registration of complications after the treatment. However a follow-up was performed only after 23,122 (51%) of the procedures recorded in the KVD. There was a difference between the public hospitals that completed follow-up after about 60% of their procedures with increasing follow-up over the period, whereas follow-up was done after only 30% of the procedures in private outpatient clinics and after 26% of the procedures performed in private hospital, with no sign of increasing figures during the period. Overall, complications were registered after 4.5% of the procedures. Infection occurred after 1.2% of the procedures, with two thirds of the infections localised in the groin. Nerve injury was reported after 1.2% of the procedures, mostly as significant sensory disturbances, but 0.2% as neuropathic pain. Post-operative haemorrhage or haematoma developed after 0.9% of the procedures, lymphatic complications after 0.3%, and deep vein thrombosis after 0.1%.

Overall, 16,379 legs had previously been treated on the same leg, equivalent to 36% redo procedures. This did not change over the 2007-2011 period. The redo

C2 varicose veins. Photo: Morten Stahl Madsen.

procedures account for 40% of procedures in private outpatient clinics, 35% of procedures in public hospitals and 28% of procedures in private hospitals. These figures are the result of the varicose vein disease and the previous procedures, but they are not indicative of how frequent new procedures are made after the operations recorded in the KVD. There are 10-15 years between primary surgery for varicose veins and a new treatment [5, 6]. The observation time in the KVD is therefore too short to allow for a meaningful assessment of recurrence after the procedures registered in the database.

DISCUSSION

In 1990-1996, about 15,000 operations for varicose veins were conducted per year [1]. The figures from this survey show that there has been no significant change in the treatment activity of varicose veins in Denmark for the past 20 years. Based on annual reports from clinical databases for a variety of diseases [7], surgery and endovenous treatment of varicose veins is the third-most common operation performed in Denmark, surpassed only by cataract surgery [8] and excision of skin on the upper eyelid [9].

In the 1990s, private outpatient clinics performed around 75% of the varicose vein operations in Denmark [1], but they now perform slightly less than half of the procedures. These are done by considerably fewer doctors as varicose veins were treated in nearly 100 private outpatient clinics in 1996 [1], while this figure has now decreased to just under 30. Nevertheless, many private outpatient clinics still perform less than 50 procedures per year. In 2012, this number was established as the minimum requirement for a medical specialist performing varicose vein operations in Denmark [10]. Further centralisation of private outpatient clinics can therefore be expected in the coming years. At the same time, it is noted that few private hospitals meet the minimum requirements established for varicose vein procedures.

The KVD is one of the few databases that collects data from both hospitals and private outpatient clinics. The database has a satisfactory coverage in public hospitals, but not in private outpatient clinics. This is, among others, due to technical problems relating to web-based data entry, and to the lack of feedback as data from private outpatient clinics could not be processed in the analysis programme of the database until 2011.

There are only few other reports of patients' subjective symptoms of varicose veins [11, 12] and they do not differ significantly from what we have found. Others have also found that cosmetic complaints are rarely a major cause of treatment [13]. Eczema, pigmentation and ulcers are known complications of varicose veins that should lead to treatment, but as demonstrated, this

! APPENDIX

Participants in the Clinical Vein Database and there total number of reported legs

Public hospitals

Friklinikken i Brædstrup og Give (8,796), Veneklinikken i Brørup (5,174), Karkirurgisk Afdeling, Aalborg Sygehus (4,211), Karkirurgisk Afdeling, Gentofte Hospital (4,161), Organkirurgisk Afdeling, Nyborg, OUH Svendborg Sygehus (3,157), Dagkirurgisk Klinik, Grenaa Sygehus (1,656), Dagkirurgisk Klinik, Ringkøbing Sygehus (1,327), Karkirurgisk Afdeling, Viborg Sygehus (1,094), Kirurgisk Afdeling, Sygehus Thy-Mors (860), Hjerte-lunge-kar-kirurgisk Afdeling, Aarhus Universitetshospital (349), Karkirurgisk Afdeling, Aabenaa Sygehus (269), Kirurgisk Afdeling, Kalundborg Sygehus (241), Karkirurgisk Afdeling, Rigshospitalet (206), Kirurgisk Afdeling, Ærøskøbing Sygehus (180), Kirurgisk Afdeling, Bornholms Hospital (106), Kirurgisk Afdeling, Køge Sygehus (63), Karkirurgisk Afdeling, Slagelse Sygehus (10).

Private outpatient clinics

Åreknudeklinikken, Næstved (5,157), Kirurgisk Klinik Roskilde (1,451), Struckmanns Klinik, København (1,434), Kirurgisk Klinik Allerød (1,038), Kirurgisk Klinik Ny Kongensgade, København (754), Kirurgisk Klinik Køge (720), Rothmans Klinik, København (229), Kirurgen.dk, København (217), Ambulant Kirurgisk Klinik, København (181), Ortopædkirurgisk Klinik Fyn (153), Kirurgisk Klinik Svendborg (130), Kirurgisk Klinik Møn (106), Kirurgisk Klinik Herlev (95), Kirurgisk Klinik Aarhus (90), Kirurgisk Klinik Esbjerg (78), Ortopædklinikken Lystrupvej, Aarhus (70), Steffen Bandier, København (59), Kirurgisk Klinik Solrød (54), Jes Henrik Steen, København (54), Arne Borgwardt, København (33), Norre Kirurgisk Klinik (28), Kirurgisk Klinik Hillerød (12).

Private hospitals

Privathospitalet Mølholm, Vejle (330), Aleris Hospitaler (191), Viborg Privathospital (145), Privathospitalet Kollund, Kruså (145), Ciconia Århus Privathospital (70), DAMP Sundhedscenter Tønder (27), Aros Privathospital, Aarhus (23), Ortopædkirurgisk Center Varde (7), Bekkevold Privathospital, København (3), HC Andersen Klinikken, Odense (3).

group of patients is not very large [14]. We have not found other reports where the frequency of bleeding from varicose veins is noted. Such bleeding can be either a spontaneous subcutaneous bleeding or an external bleeding, which is often a very dramatic experience for the patient and might be fatal in a limited number of cases [15].

Data from the public hospitals in England show that the number of endovenous procedures has increased rapidly in recent years, and in 2008-2009 they accounted for more than 50% of the procedures performed in England [16, 17]. In the United States, it is estimated that 95% of interventions are performed endovenously, whereas in Germany the estimate is that only 10% are endovenous procedures [18]. Our finding of 15% endovenous procedures in Denmark in 2011 covers the reports to the KVD, but – as stated – only about 40% of the many procedures in private outpatient clinics are reported to the database. The remaining 60% can be assessed on the basis of reports from private outpatient clinics to the Health Incurrence. These reports show that 37% of the missing procedures consist of "Operation of varicose veins in the groin", and 63% are "Operation of varicose veins, exclusive groin". These figures suggest that the endovenous treatment in Denmark accounts for an even lower percentage than 15%, and that the good results obtained with these new methods were only sparsely offered to Danish patients in the period leading up to 2011 [4].

Although we only have follow-up data on 51% of the interventions, we can specify complication rates after a very large number of procedures performed in many units across the country. Overall, there is an acceptably low risk of complications, which in most cases results in an extended period of recovery, but with no long-term sequelae. An exception to this is the rare cases of neuropathic pains, which we found in 0.2%. We have not found any other studies in which this frequency is specified, but the frequency is far below the 5-10% who develop chronic pain after surgery for inguinal hernia [19]. Deep vein thrombosis is another serious complication, which can cause persisting symptoms. We found this after 0.1% of the procedures, whereas a large registry study from England found a slightly higher incidence of 0.36% [20].

There are several reasons for recurrence of varicose veins after a previous treatment, but whatever the cause, the patient will experience that the varicose veins return and this may result in a need for further treatment [5]. Our results show that despite the increased focus on the treatment of varicose veins over the past 15 years, the number of patients retreated now corresponds to that observed in the 1990s [1]. With the establishment of the KVD, it was made possible, among others, to clarify this important issue in a very large number of patients and with the necessary long observation period. It is therefore beyond belief that the Databases' Joint Secretariat chose to close the KVD for economic reasons.

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