Superficial venous pathology describes a spectrum of disease related to an underlying dysfunction of the venous system due to either reflux or obstruction. Although rarely life threatening, chronic venous disease (CVD) presents a significant burden both to those affected and to society. It is highly prevalent, with spider veins, varicose veins, and chronic venous ulceration (CVU) affecting up to 80%, 40%, and 2% of the population, respectively. Despite the low prevalence of ulceration, CVU costs up to 2% of the national health budget of Western societies due to its chronic nature and labor-intensive management. Furthermore, the quality of life of those with different stages of CVD is significantly affected, and a higher prevalence of depression is present in this population. Importantly, the burden of CVD is expected to rise in function of the aging and increasingly obese population; as such, measures and techniques to improve its prevention and management are essential.

Over the last 2 decades, the treatment of CVD has been revolutionized, moving from open surgical high ligation and stripping to minimally invasive, day surgery procedures. These procedures have the advantage of a shorter treatment time and allow a quicker return to daily activities. In particular, the endothermal techniques, radiofrequency ablation, and endovenous laser ablation have become commonplace in the management of CVD. Despite having been shown to have as good, if not better, ablation success rates and quality of life outcomes compared to surgery, these endothermal techniques can still present specific risks relating to thermal injury. This is reduced by the administration of tumescent anesthesia which, although effective, can be cumbersome for patients. In light of this, novel techniques have recently been developed by industry, representing the next generation of endovenous therapy. The nonthermal nontumescent (NTNT) techniques, including mechanochemical ablation and glue, do not employ thermal energy, thereby avoiding the risk of thermal injury and the administration of tumescent anesthesia. These are currently the subject of ongoing studies to assess their longer-term efficacy.

The importance of these studies, their design, and their findings cannot be underestimated. Gone are the days when decision making was the remit of a single expert. We now live in the era of big data, evidence-based medicine, and peer review, with the means, technology, and skills to extract high-quality data and generate important, evidence-based conclusions regarding health care.

The Importance of Data-Driven Decisions in Superficial Venous Pathology to Achieve Optimal Outcomes

The role of data-driven decision making in the context of superficial venous interventions and how it can positively affect patient care.

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DATA-DRIVEN DECISION MAKING

Data-driven decision making (DDDM) describes the collection and analysis of data with the aim of improving outcomes. It has applications to health care, education, and management and is based upon a conceptual framework that was initially developed in the context of education. This framework relies upon a number of necessary steps, including the assembly of high-quality, raw data; the analytic capacity to perform suitable data analysis; and a culture of DDDM leading to the development of data-driven interventions (Figure 1).

In health care, DDDM has important applications and potential to improve patient outcomes. Now more than ever, with health care systems under pressure to reduce costs and manage resources more efficiently while improving health care delivery and quality, a DDDM approach can permit the development of informed decision-making processes to ensure care is as efficient as possible.

Examples of DDDM applications include identifying patients who require significant health care resources or who are at risk for adverse outcomes, developing targeted programs to this subpopulation; identifying cost-effective versus noncost-effective interventions and addressing where savings can be made; and taking preventive measures in high-risk patient groups to avoid longer-term sequelae of disease. The applications of DDDM span all health care and academic areas, from basic science to epidemiology to intervention. So how is DDDM relevant to superficial venous pathology?

DATA-DRIVEN DECISION MAKING IN SUPERFICIAL VENOUS PATHOLOGY

Because of the high prevalence of CVD, its expected increase in disease burden, and the cost it represents to society, this condition is a prime example of where DDDM can have and is having a positive impact. DDDM is currently being utilized in many ways. The process of developing clinical practice guidelines includes collection of data in a systematic fashion, appraisal of the data via standardized methodology, and development of recommendations to change practice for the better. However, as seen in both CVD and CVU guidelines, significant heterogeneity exists between the different documents, particularly relating to the assessment of levels of evidence and development of guideline recommendations.

With respect to cost-effectiveness, much is being done to provide evidence-based guidance for interventions that are “value for money.” In the United Kingdom, the National Institute for Health and Care Excellence is tasked with this responsibility, appraising the available evidence for the most clinically and cost-effective interventions. This will become increasingly important in the United States, where health care spending represents over 16% of the gross domestic product, and payors will be looking at ways of ensuring the covered treatments are cost-effective.

Therefore, despite current efforts, much can be done to improve the effectiveness of DDDM in superficial venous pathology. However, in order for this to happen, changes may be necessary in how data are acquired, analyzed, and interpreted.

ACQUISITION OF HIGH-QUALITY DATA

Data can be acquired in many different ways and from a number of different sources depending on the study, including clinical, operational systems, and national databases. Data may be manually input or streamed from monitoring devices and derived from within organizations or external sources.

In the context of interventions for superficial venous pathology, such as the NTNT techniques, it is important that high-quality data are obtained in the context of large, multicenter, randomized controlled studies with appropriate follow-up to enable assessment of the longer-term results. For the data to be high quality, standards should be in place so that the same data are collected across sites. Ideally, this should be done in the context of a clinical trials registry to ensure data accessibility and transparency and with international society endorsement to maximize participation.

In addition to study design, high-quality data also rely upon assessment of appropriate outcomes. In the context of CVD, which presents a significant burden in terms of signs and symptoms of disease, patient-centered outcomes (particularly quality of life measures) are of paramount importance and should be explored. This may be done in a standardized fashion, such as the patient-reported outcome
measures assessment system endorsed by the Department of Health in the United Kingdom, which has been valuable in assessing patient perception of postprocedural success and satisfaction. Incomplete data collection can result in a reduction of sample size power and may be a source of bias; therefore, realistic data points must be determined to ensure the collected information is of high quality.

Data Integration, Analysis, and Interpretation

Once data are acquired, appropriate analytic methodology should be employed to generate data of interest. Importantly, data analysis should be performed with the aim of fulfilling primary and secondary endpoints that are relevant to patients and clinical practice. Management of CVD involves many specialties, including vascular surgeons, dermatologists, intervention radiologists, family practitioners, and nursing staff. As such, data assessed by research groups can generate different types of information depending on the outcomes of interest, leading to significant heterogeneity in the available evidence that can be confusing for health care practitioners and patients looking for guidance. Being a multidisciplinary subspecialty, CVD data assessment and interpretation should be performed with the aim of responding to important clinical questions of relevance to patients and with realistic impact to change management.

CONCLUSION

CVD is an important health care condition that bears a significant clinical, social, and financial burden. The changing health care environment, with the necessity for greater savings and improved efficiency, combined with the expected increase in the prevalence of disease (and therefore its complications), means that recommendations with respect to its care are best assessed using a data-driven approach. The assessment and investigation of CVD have been the topic of research studies and guideline recommendations over the last 30 years. Only recently has the idea of DDDM become more prevalent. DDDM combined with the primary goal of improving a patients’ quality of life are relatively new concepts that are now at the forefront of venous disease care. The care of our patients continues to improve, as these concepts are increasingly embraced by all involved. In the end, care that utilizes DDDM makes the most sense for all.