Understanding syncope – not for the faint hearted

Syncope, commonly known as fainting, occurs when an individual experiences a temporary loss of consciousness caused by a decrease in blood flow to the brain. **Professor Robert Sheldon**, working at the University of Calgary, has dedicated much of his career to the investigation of syncope and its causes. Over the past three decades, extensive collaborative international research has explored this phenomenon with the aim of providing timely access to high quality care, while giving patients the tools that empower them to manage their condition themselves.

Episodes of 'syncope' or sudden fainting followed by a relatively speedy recovery make up approximately 1%–1.5% of all emergency department visits. The tests and diagnoses following these episodes can be extremely varied, making the effective evaluation and treatment of affected individuals difficult. Working closely with international colleagues, Professor Sheldon at the University of Calgary and founder of the Canadian Autonomics and Syncope Alliance, has studied syncope extensively for almost 30 years. This highly collaborative research has forged the way for the development of effective guidelines and improved diagnosis, management and treatment.

CAUSES OF SYNCOPE

Syncope episodes can be related to a wide range of biological factors or medical conditions. Vasovagal syncope, mediated by the autonomic nervous system, occurs when an individual's heart rate and blood pressure react to either physiologic stresses or a particularly disturbing trigger, such as the sight of blood. It is the most common type of syncope, and research shows it has high remission rates. Investigating the frequency patterns of vasovagal syncope episodes in patients who experience recurring episodes (more than four a year), Sheldon and colleagues found these episodes tended to occur at random points in time, with a wide range of frequencies, from less than once a decade to more than monthly. Surprisingly, the tendency to faint stops abruptly in many people.

Syncope can also be part of other underlying medical conditions. These include postural tachycardia syndrome (POTS) characterised by frequent symptoms when standing, including light-headedness, tremor, weakness, exhaustion, and blurred vision, as well as an increased heart rate while shifting from a recumbent to standing position.

A COMMON PHENOMENON

Syncope episodes are considerably common and a proportion of patients who experience them are admitted to hospital to undergo further assessment to ascertain whether the syncope is related to an underlying medical issue. In order to be exhaustive, tests and assessments need to target several different organ systems, employing different technologies. This process can be time consuming and often requires a substantial amount of resources.

Syncope-related visits to the emergency service that are followed by non-fatal but severe outcomes are a minority and generally only half of these are found to have underlying cardiovascular causes. A recent study by Professor Sheldon and his colleagues analysed ▶

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syncope hospital admissions over a ten-year period and found that syncope hospitalisation rate was 0.54 per 1,000 population, with 63% of these patients being low-risk, and less than 1% of these patients dying in hospital (*Canadian J. of Cardiol*, 2017). The varied amount of possible causes for syncope episodes and the fact that following outcomes can range from no consequences to more serious health implications including death, make the assessment of patients approaching emergency services difficult.

SYNCOPE ASSESSMENT GUIDELINES

Despite syncope patients making up a large proportion of his clinical practice, when Professor Sheldon entered the field almost 30 years ago, very little was known about the condition at that time. To gain a better understanding, Professor Sheldon and his team turned to tilt table tests. This simple research tool ascertained the cause of fainting spells by tilting the patient at different angles (from 60 to 80 degrees), while monitoring heart rate and blood pressure. Although the tilt table became a recognised clinical diagnostic test, Sheldon and his team quickly acknowledged its limitations and embarked on a ten-year programme exploring effective ways to diagnose different syncope types.

Having first highlighted the need to reduce the inaccurate and unnecessary technology to diagnose syncope, by 2006 the collaborators developed a Symptom Score based on historical criteria of patients. This questionnaire detailed symptoms and past medical history, distinguishing vasovagal syncope from syncope of other causes. With its high specificity and sensitivity, it was shown to correctly classify 90% of syncope patients. The Symptom Score is now widely used clinically, resulting in a large reduction of health care utilisation and expenditure. Symptom Scores have also enabled easy patient enrolment into randomised clinical trials and have been used in genetic studies of older patients and other studies with reproducible, objective criteria to guide best practice for diagnostic methods. More recently, the scores have proved invaluable for studies aimed at understanding the roles of placebo and patient–doctor interactions to improve patient outcomes. Professor Sheldon continues to be a strong advocate for the development of new standardised approaches to help doctors quickly and accurately identify the causes of syncope. This is illustrated by his recent participation in the development of an exhaustive guidelines for the evaluation and management of patients with syncope, published by the Heart Rhythm Society in 2016 and the American College of Cardiology / American Heart Association in 2017.

ACHIEVING THE GOLD STANDARD OF TREATMENT

There are large disparities between health care systems for the provision of care following syncope. Patients often experience difficulties accessing appropriate care, inappropriate tests are carried out and few people are empowered to manage their own care. Syncope treatments range from pharmacological cycles, to psychiatric or psychological therapy, planned lifestyle changes, invasive interventions and exercise training. The driving force behind a collaborative series of randomised clinical trials, Professor Sheldon investigates effective treatments. Exploring a number of pharmacological treatments for vasovagal syncope, these Prevention of Syncope Trials have demonstrated the probable effectiveness of two common drugs, metoprolol and fludrocortisone. With four additional trials well underway, researchers aim to provide the gold standard in evidence for treating patients with frequent vasovagal syncope.

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THE PATIENT VOICE

How best to provide care to people and patients who faint is front and centre for the Canadian Autonomics and Syncope Alliance (CASA). Established in 2013, this national network of syncope patients and investigators fosters synergies and interactions with the aim of delivering better care. Through CASA's collaboration with the Canadian Arrhythmia Network, syncope has been pushed up the agenda and secured federal support. Their joint goal is to reduce unnecessary emergency department visits and subsequent admissions to hospital. A Patient's Day hosted by CASA provided a forum to engage patients in planning syncope research strategy. Important priorities for patients included timely access to high quality care and having appropriate tools to help manage syncope independently. Collaborating with the UK organisation STARS UK, Professor Sheldon and colleagues are working to develop and test patient education tools, and through their input into the very international Gargnano Working Group on Syncope Research in the Emergency Department continue to work towards streamlining the emergency care of syncope patients.

Not only has Professor Sheldon advanced the understanding of causes and treatment of different syncope-related conditions, he continues to play a lead role in fostering collaborations highlighting the need for more efficient and standardised care. Advocating the importance of a detailed medical history (rather than investigations) in the assessment of syncope, he is an influential voice promoting a patient-centred approach in a field dominated by technology.

Q&A

What initially sparked your interest in syncope?
I was fresh in practice in a hospital, miles from my basic science lab, and was swamped by syncope referrals, without a clue what to do. One night I was using a pacemaker company brochure as a coffee coaster, and when I lifted up the mug there in a nice brown circle were the words "syncope, tilt table test, Richard Sutton". A true "Aha" moment: a new field, a new tool, very little known, a large population, and a huge unmet clinical need. How could things go wrong?

What do you feel were some of the most important findings of syncope-related studies over the past decade or so?
There have been interesting themes that I think have pointed the way forward. The physiology of vasovagal syncope is becoming a little more clear, as several groups have shown that the first step in the pathophysiologic cascade seems to be dependent venous pooling, probably mainly in the abdominal splanchnic venous beds. This raises a slew of other questions about why syncope occurs at such idiosyncratic rates, and of course why some people faint and others don't. There are a few genetic studies but none are conclusive. Several lines of evidence now point to the existence of a syndrome characterised by complete heart block that is sensitive to ATP and adenosine, and much remains to be done. Two drugs (metoprolol and fludrocortisone) and permanent pacemakers show exciting promise as effective treatments. One of the most promising developments is the development of national and international networks of investigators aimed at making overall care both more effective and more efficient. These are harnessing the multidisciplinary efforts of investigators in the UK, North America, and Europe.

What would you say should be the main goals of current and upcoming research into syncope?
We need to know the ultimate biological causes of syncope, develop targeted precision treatments, harness the role of the placebo, and prevent much of the unnecessary investigations and admissions.

How important is it for you to work with syncope patient groups?
It is important, pivotal and exhilarating. They have set our priorities and work closely with us, providing insights and checks, as we develop and implement new studies and move the findings into new policy and practice. It is really quite a wonderful development.

What are your plans for future research and investigation?
We are finishing up three big studies aimed at understanding whether there is a genetic association with vasovagal syncope and three drug clinical trials. We are also well into a programme of studies on harnessing the placebo effect, and are working with patients and health systems to try to reduce unnecessary emergency department visits.

Detail

RESEARCH OBJECTIVES

Professor Sheldon is dedicated to advancing cardiovascular research locally, nationally, and internationally. A world-renowned researcher and thought leader in the investigation and treatment of syncope, he has developed the Calgary Syncope Score, which resulted in a large reduction of health care utilisation and expenditure and is the world leader in randomised clinical trials of diagnostic and therapeutic strategies for syncope.

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BIO

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