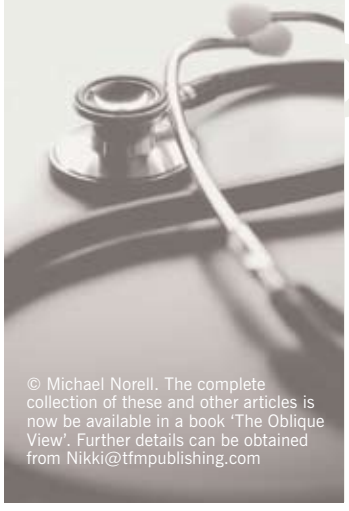
Things you always wanted to know about ... the stethoscope

Michael Norell

Consultant Interventional Cardiologist and PCI Programme Director, The Heart and Lung Centre, Wolverhampton, WV10 0QP

(Michael.norell@rwh-tr.nhs.uk)



We continue our series in which Consultant Interventionist Dr Michael Norell takes a sideways look at life in the cath lab...and beyond. In this column, he looks at the many roles of the stethoscope in medical practice ... past, present and future.

First, the basics. When the French physician Laennec (1781–1826) invented the stethoscope in 1816, he got the idea from some children playing near the Louvre who applied their ears to the ends of long pieces of wood and listened to the transmission of sound produced by pin scratches. He then knocked up a wooden cylinder as a prototype and the rest, as they say, is history. He is more renowned for recognising and naming various phenomena associated with chest auscultation (pectoriloquy, aegophony and rales – remember them?) rather than those of the heart, as at that time the physiology of the latter was less well appreciated.

Nevertheless, to this day, the product of his efforts remains in our coat pocket, briefcase or office drawer. Sadly, echocardiography has heralded the demise of cardiac auscultation. I say this because even trainees in our speciality will request ultrasound scans with 'systolic murmur: ?cause', on the form and then have to juggle with the result when it comes back with 'mild TR and moderate MR. Thickened AV leaflets with reduced excursion. Maximum gradient of 23 mmHg'.

However, I hope to illustrate that if used properly the apparatus has other functions – and I don't mean just to improve the takings of the common-or-garden safe cracker. For instance, it has become the universal badge of the practising medic.

In any TV hospital soap or medical drama (The Oblique View, *passim*), you will always be able to spot the junior doc. He is the tired-looking, slightly foppish, Hugh Grant-esque character, wearing green scrubs and a five o'clock shadow. She is similar – immaculate and usually without the shadow – but they share the now ubiquitous insignia identifying them as medics: their stethoscopes are draped around the back of their necks and over their shoulders in the same way that the French or Italians are able to sport sweaters (and get away with it). The consultant, on the other hand (male or female), is the supercilious one in the pin-stripe suit, clean shaven but with the stethoscope clasped around the neck (in the traditional way) and tubes straight down the front of the chest, lying over either a garish silk tie or an unmistakable cleavage (or both).

I have never been taken with the 'over-the-shoulders' approach; it suggests an air of casual informality and in the patient's eyes may also reduce the stethoscope's magical value. (We should never underestimate the therapeutic potency of the physical examination, and a cold metal disc or bell, moving around the chest and somehow revealing a patient's innermost secrets to the connected listener is an important example of this almost witch-like power). However, the latter style carries the risk of the diaphragm of the device swinging against your belt buckle; if the ear pieces are in your lugholes at the time, the resulting 200 decibel crack can really put your teeth on edge.

What are the other options? The jacket pocket is all very well but does not allow rapid removal as all too often some part of the apparatus gets caught in the lining. Alternatively, simply holding it in one hand may be valuable in adding emphasis to verbal communication, but can be cumbersome if one also wishes at the same time to handle a coffee, reading glasses, pen, etc.

Get out of jail free?

In times long gone, an indirect use of the 'I'm a doctor' function was enjoyed when parking illegally. By leaving one's tubes on the dashboard it was hoped that a passing warden would naturally assume that the car owner was attending to a pressing medical emergency and therefore show some latitude rather than stuffing a ticket under the windscreen wipers. Sadly this ruse rarely worked; even wardens have sufficient nouse to twig that if you have parked on a yellow line in order to sort out a clinical crisis, then you would be likely to take your tubes with you.

Similarly, while speeding, and unfortunate enough to be passed by a police car, waving a stethoscope

CONTINUED ON PAGE 218

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THE OBLIQUE VIEW – CONTINUED FROM PAGE 205

to imply that you are rushing for medical reasons, may work once. The story goes that when this particular doctor was exceeding the speed limit again later that night, he was passed by the same police car. The previously successful manoeuvre was greeted with the officer shaking his head, smiling and waving his handcuffs!

Maintain dignity

Always ensure that both soft rubbery earpieces are well screwed on to the metal tubular segments. Losing one makes auscultation hazardous as a result of lacerations to the external ear. In addition, any gravitas that you may have wished to engender as you complete your examination, take off your stethoscope and sigh thoughtfully before giving the patient your considered opinion, is lost if one black rubber earpiece – or worse, both – is still poking out from the side of your head.

The medic and humourist, Rob Buckman, related a tale from his student days when examining the heart of a well-endowed woman. The business end of his 'scope was securely anchored over the apical impulse, being held in place by a large overlying breast so, unoccupied as they were, his hands resorted to finding refuge in his trouser pockets. This vision was disrupted when a bleep went off causing him to stand up suddenly. With a 'splap', the scope was suddenly yanked free from its precordial hiding place and, after a brief period of airborne freedom, came to rest in an adjacent jug of orange juice.

I am not sure how well medical students are informed about the proper functioning of this important accessory. Many seem to have mislaid the rubber ring that covers the rim of the bell, unaware that its purpose is to exclude unwanted extraneous noise. Without it, the bell is applied with greater pressure on the chest wall causing the skin to be stretched and become a diaphragm, thereby potentially filtering out some low frequency information. That, at least, is the theory.

And just how long should the tubes be? Clearly, sufficient to make auscultation comfortable, but can they be too long? Well theoretically, yes. Imagine: if the journey of sound waves from valve closure to ears is too lengthy then, while you listen and simultaneously palpate the arterial pulse, the tactile recognition of systole may be appreciated earlier than the auditory reception of the first heart sound. Systolic events may thus be mistimed as diastolic ones, and vice versa. (If you believe this then you might benefit from the helpline number at the end of this column. Note: the speed of sound at sea level is 344 m/s.)

Are two rubber tubes better than one – either combined or separate? I still have a Thackray type but often the separate hoses knock together producing non-physiological noises. Is there a scientific basis on which to favour one, over two, sound channels? Certainly the original auditory information comes from the same place, so I doubt that travelling separately – or together – to either side of the head, makes much difference.

What of the future?

How will the high-tech digital age impact on the design of this rather old-fashioned – if not slightly quaint – piece of kit? Well, micro-processing is already here. The auditory signals can be converted into digital format and displayed in the same way as phonocardiograms. The resulting images can be viewed on the back of the scope or stored to be downloaded later, thus allowing auscultation distant from the patient's bedside, and at your leisure. This may have definite educational value in terms of better defining the timing and character of cardiac murmurs but as access to echo becomes easier, I somehow doubt that our future doctors will be better clinical cardiologists than their predecessors.

But will such sophisticated technology actually have any place in our twenty-first century hospitals? The scourge of various superbugs that pervade our wards means that, in addition to ties, white coats and various items of fashion jewellery, the humble stethoscope will be another item to be cast aside in the pursuit of infection control. No longer will it be able to travel around the wards with its dedicated owner, sampling auditory information from patient after patient like a honey bee, and thereby unknowingly pass on potentially lethal micro-organisms. Instead each bed will be equipped with its own array of diagnostic instruments – including our old and trusted friend.

Logically, they should also be disposable. Thus, we can predict that in terms of quality, they will fall far short of even those bright red and cheap examples our nursing staff currently supply us with whenever we come to the ward 'scopeless'. So, in summary, what we need is someone to design a very basic, simple and inexpensive device that can be mass produced in order to fill this auscultatory gap … Monsieur Laennec, ou es tu?