

## Why so few women in interventional cardiology?

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I decided a long time ago to write a President's page on the role of women in interventional cardiology in Europe. Believe me, I am not doing it because I feel that this is "politically correct", out of courtesy towards our female colleagues or because the last issue of EuroIntervention was –in part– dedicated to the way gender influences the results of percutaneous interventions, including a paper authored by twelve of the most prestigious female interventionalists in the world<sup>1</sup>. I am doing this because I am concerned that the quality of interventional cardiology will suffer from the exclusion –and I tend to say self-exclusion– of the majority of future graduates in medicine, who are bound to be women.

### An epochal change in medical training

More than sixty percent of the students admitted to the Faculty of Medicine at the University of London are women, and I am told this percentage rises to above 80% in countries like Russia. It is a rapid and dramatic change. When I left college, half of my male schoolmates followed me into medical school. My 21 and 19 year old sons recently opted for geology and business school and hardly any of their male schoolmates considered medical school as an option. Not really sound statistics, but personal experience is sometimes more convincing that a major change has occurred since the time I, and probably most of my readers, attended medical school. I was particularly impressed by a controversial editorial for "The Independent" in 2004 by a brilliant female Professor of rheumatology, Dame Carol Black, written while serving her term as President of the Royal College of Physicians<sup>2</sup>. She claimed that this rapid shift of gender predominance was not just a positive result of female emancipation, with girls attending the best colleges and obtaining, on average, better results than their male schoolmates because of the greater maturity of female teenagers. She also attributed this shift to a downgrading in the public esteem for the medical profession, to the loss of its appeal in terms of social status

and financial reward, to the progressive transformation from a "liberal" profession to just another clerical job. I personally think she has a point, but reversing these negative trends requires a hard battle which needs to be fought by the entire medical profession and not just by a tiny minority of interventional cardiologists. Whatever the cause, the female predominance in the Faculties of Medicine throughout Europe is a fact and is reflected by the prototype of young trainees in their foundation years in internal medicine. I am confronted every day at work with bright hard working, very motivated young ladies, often, but this is probably limited just to this part of London, of Asian origin. How does it come to be that the gender distribution drastically changes among cardiology trainees and the difference in favour of the male gender becomes truly dramatic for Fellows willing to embrace interventional cardiology as their main subspecialty? Since 2004, when we started to hold interviews at the Brompton to select candidates for the interventional cardiology training programme, we have had no female candidates with a valid UK cardiology training number. Since 2003, among the international Fellows attending our interventional cardiology department for training or research, we had outstanding female fellows but they were only two out of a total of 11.

### Trends in interventional cardiology and work opportunities in Europe

I think the exponential rise in the number of cathlabs and the consequent rapid increase in the need for new interventional cardiologists which has characterised Western Europe in the last two decades is definitely over. Probably the UK has seen the last big boom of services because it lagged dramatically behind in the 80s and 90s. There is still under-utilisation of PCI for unstable coronary syndromes, especially primary angioplasty, also in some rich European countries with an otherwise high quality health system<sup>3</sup>. Some broadening of indications may occur if the long term follow-

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up of recent and ongoing trials confirms the substantial equivalency for the hard endpoints of death, myocardial infarction and stroke between bypass surgery and PCI with DES in patients with left main disease and multivessel disease<sup>4</sup>, and if more reliable, less operator dependent methods are introduced to open chronic total occlusion<sup>5</sup>. The other changes are due to the complex interplay of risk factors disappearing or being better controlled, such as smoking, hypertension and hypercholesterolaemia, or on the rise such as diabetes and obesity, complicated by the presence of an ageing population and a steady flow of young immigrants. If you add to these variables tighter and tighter regulations imposed to satisfy cost-effectiveness parameters set up by health economists who are controlling – via a growing bureaucracy – the distribution of medical services, I think future trends cannot be predicted with any more reliability than the economists have predicted the recent economic downturn and the time when it will end. I certainly do not discourage young cardiology specialists, male or female, from going into interventional cardiology, but I understand why more and more trainees go into electrophysiology, heart failure or imaging. With few new positions offered, and a very low average age of the practising interventionalists, the natural generational change will offer few opportunities in the near future. To me, these considerations should not prevent keen gifted cardiologists from choosing the most rewarding of the cardiology subspecialties, able to offer dramatic immediate improvements in patient prognosis and well-being. They must be highly motivated to enter a profession which requires quite a lot of on-call, out of hours work, and make sure the quality and variety of their training offers them an edge on other cardiology trainees. It is, in fact an ideal time to design a more robust program of interventional training because fellows are aware that the tough selection for the few future interventional posts requires an optimal, well-certified, theoretical and practical training.

### **Discrimination against future female interventional cardiologists?**

These considerations apply to all potential new interventional fellows, male and female alike. Why then are there so few women willing to train in interventional cardiology? Is it an active discrimination against women at the time of selection? I cannot exclude that this happens in individual cases, but I know enough cathlab directors throughout Europe to say this is not a valid explanation. In the old days you could hear comments about the incompatibility of frail women and heavy surgical work, which requires standing for hours in theatres and physically demanding activities. I said last time that interventional cardiology is a hybrid activity in between surgery and medicine<sup>6</sup>, but turning and pushing fine wires and catheters is certainly not as physically demanding as doing orthopaedic surgery. It requires coordination, precision, attention to details – which are universally considered feminine qualities. In the last issue of EuroIntervention, twelve of the finest interventionalists in the world examined the specific problems of applying percutaneous revascularisation in women with heart disease: they are all women, they are leaders of interventional teams in countries as different as the United States, Canada, Australia, South Africa, Argentina, Spain, Italy, France and the United Kingdom.

### **Self exclusion, radiation exposure and working pattern**

Why do young female doctors avoid cardiology in general and interventional cardiology in particular? In my view, radiation exposure and a working pattern incompatible with a normal family life, especially when there are small children, are the two reasons causing this self-exclusion. The problem of radiation is not negligible. The authors of the article quoted above<sup>1</sup> address this issue in relation to women both as patients and as operators. They clarify that the period of high risk for teratogenesis is limited to a few weeks but I do not think we should force our women colleagues to work at a cathlab table in advanced pregnancy. With the low fertility of European women, it is difficult to expect more than two pregnancies and three years out of the cathlab, something which is less than 1/10<sup>th</sup> of the expected active life of an interventionalist. Appropriate existing legislation to protect and defend working women throughout their pregnancy should be used to obtain temporary replacements, while the pregnancy periods can be usefully employed to refresh their general cardiology skills, to learn or practice imaging techniques complementary to interventional cardiology such as non-invasive coronary imaging with multidetector computed tomography, or to focus on research. In the first years of their childrens lives, when a flexible working pattern is required, new organizational patterns of work should be adopted to allow part time work and, in some cases, exclusion or reduction of the burden of active on-calls. Ensuring that a sufficient income is offered to a highly stressful profession as is interventional cardiology, with an adequate premium for out of hours work, can facilitate the availability of sufficient support to look after the children at home. In some countries, paternity leaves are already becoming more frequently used and can avoid excessive leave of the mother when the children are sick or need support at home. Of course this requires some degree of flexibility from the directors of the interventional program, as well as from the hospital administration.

### **Radiation protection receives insufficient attention in cathlabs**

I regularly organize training courses for interventional Fellows, and radiation protection is often one of the subjects which elicits little interest before the lecture, only to be discovered afterwards as relevant in order to avoid permanent damage from long-term exposure<sup>7</sup>. My experience is that the local radiation protection policy is often led by radiologists who are not part of the interventional team. The focus is on avoidance of radiation induced damage to the patient, while innovations to reduce operator exposure, especially if they require changes in practice and additional cost, are rarely implemented. I have seen cathlabs where operators work behind a thick sarcophagus, with a lead sheet on the lower patient body and automatic sensors to lower the flat screen detector as close as possible to the patient's body. If this is coupled with an effort to avoid extreme angulated views and reduce the number of frames per second whenever possible<sup>8</sup>, the monthly readings below the X-ray apron are close to zero, reassuring our female colleagues in their fertile period that no mutagenic effects are expected to the oocytes

and no teratogenic effects may derive from inadvertent exposure in the early pregnancy. We must change our “macho” mentality towards radiation, not following the bad example of some interventionalists who enter the cathlab uncovered, intolerant of the time spent adjusting fixed shields and the position of the tube and the filters. We must insist to have a practising interventionalist as part of the radio-protection team forcing the necessary investments in shields, control and renewal of aprons and purchase of more efficient X-ray systems. We also must understand better the specific occupational risks in our profession. I welcomed the request of Marie-Claude Morice, the EAPCI representative in the ESC Council of Cardiac Imaging, to forward to all EAPCI members a questionnaire prepared by Sonia Petronio and Eugenio Picano to study the correlation between radiation exposure and breast cancer among female interventional cardiologists.

### The importance of innovation

I am fascinated to watch Sabine Ernst, a German electrophysiologist working with me at the Brompton, who has enormous experience with the Stereotaxis system, spending most of the time during these long sessions safely seated behind the screen of the control room, performing a greater part of the ablation procedure totally shielded from radiation once the catheters have been positioned under fluoroscopy aided by co-registration of non-invasive MSCT or CMR images and the CARTO mapping system. With the disappearance of the generation of pioneers who started interventional cardiology, we have comforted ourselves with the routine of old practices and not paid the same attention to technical innovation of other subspecialties such as electrophysiology and imaging. We may envisage a similar working pattern, seated far from the patient, using a combination of existing systems such as the Mediguide, the Stereotaxis and the Corindus system<sup>9-11</sup>. Very little attention is paid to these innovations by the interventional community, which translates into low levels of investment from the industry and a low likelihood that these techniques will become lively alternatives to the current practice in the near future.

### Female interventionalists and the EAPCI

Interventional societies must lead these changes for the benefit of their members and the interventional cardiology community at large. The presence of a meaningful representation of female interventionalists is certainly an important step in this direction. We do not have the credentials of our US counterpart - the Society of Cardiovascular Angiography and Interventions (SCAI) with Bonnie Weiner as immediate Past-President - for the simple reason that not a single female interventionalist applied to any elected position in our European Association. My first commitment as EAPCI President, supported by the entire Board, was to have an injection of novel ideas and attention to the specific problems of practising female interventionalists by nominating a fair number of women to lead or be members of the Committees which constitute the backbone of our Association. If you look at the list of the Committee members on the EAPCI website<sup>12</sup>, you will certainly know the names of those female interventional colleagues included, and you will agree, with me, that they were nominated because of their specific

expertise and not just their gender. It is a big change from the previous years when no women were present at all in the EAPCI Board and Committees but you may say that four women vs. 76 men is still far from ideal. This low percentage (5%) is even lower than the percentage of practising female and male interventionalists (in Italy 125 v 886, 12.5%). I hope my successors in the Presidency will convince the national societies to nominate more and more women as candidates in the EAPCI committees. Irrespective of their absolute number, however, I am sure that their presence in these prestigious positions for the next two to four years, starting with Martine Gilard in charge of the key Training Committee, will ensure specific attention to the problems of female interventionalists and hopefully offer a role model to young female cardiologists considering the possibility of the following this career path and engaging in the activities of the Association. If we want to inject new life into a specialty which has undoubtedly lost, in the recent past, part of its appeal for young doctors looking for career opportunities, we must concentrate on high threshold of selection to ensure the high quality of interventional standards and we must go back to the origins of interventional cardiology and return to being number one in innovation as were our founders 20-30 years ago. This will never happen if we do not remove the obstacles preventing more than 50% of our bright young trainees from considering a future in interventional cardiology.

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### References

1. Chieffo A, Hoyer A, Mauri F, Mikhail GW, Ammerer M, Grines C, Grinfeld L, Madan M, Presbitero P, Skelding KA, Weiner BH, Mehran R. Gender-based issues in Interventional Cardiology: a Consensus Statement from the Women in Innovations Initiative. *EuroIntervention* 2010;5:773-9.
2. Black C, <http://www.independent.co.uk/life-style/health-and-families/health-news/the-medical-timebomb-too-many-women-doctors-551149.html>
3. Widimsky P, Wijns W, Fajadet J, de Belder M, Knot J, Aaberge L, Andrikopoulos G, Baz JA, Betriu A, Claeys M, Danchin N, Djambazov S, Erne P, Hartikainen J, Huber K, Kala P, Klineva M, Kristensen SD, Ludman P, Ferre JM, Merkely B, Milicic D, Morais J, Noc M, Opolski G, Ostojic M, Radovanovic D, De Servi S, Stenestrand U, Studencan M, Tubaro M, Vasiljevic Z, Weidinger F, Witkowski A, Zeymer U; on behalf of the European Association for Percutaneous Cardiovascular Interventions. Reperfusion therapy for ST elevation acute myocardial infarction in Europe: description of the current situation in 30 countries. *Eur Heart J*. 2009 Nov 19. [Epub ahead of print]
4. Serruys PW, Onuma Y, Garg S, Vranckx P, De Bruyne B, Morice MC, Colombo A, Macaya C, Richardt G, Fajadet J, Hamm C, Schuijjer M, Rademaker T, Wittebols K, Stoll HP; ARTS II Investigators. 5-Year Clinical Outcomes of the ARTS II (Arterial Revascularization Therapies Study II) of the Sirolimus-Eluting Stent in the Treatment of Patients With Multivessel De Novo Coronary Artery Lesions *J Am Coll Cardiol*, f2010 Jan 29. [Epub ahead of print]
5. Di Mario C, Werner G, Sianos G, Galassi A, Büttner J, Dudek D, Chevalier B, Lefèvre T, Schofer J, Koolen J, Sievert H, Reimers B,

Fajadet J, Colombo A, Gershlick A, Serruys PW, Reifart N, the EuroCTO Club for European perspective in the recanalisation of Chronic Total Occlusions (CTO): consensus document from the EuroCTO Club *EuroIntervention* 2007;3:30-43.

6. Di Mario C. Interventional cardiologists: a new breed? *EuroIntervention* 2009;5:535-37.

7. [http://www.pcronline.com/fo/lecture/2009\\_fellows\\_course/view\\_slide.php?slide\\_id=378](http://www.pcronline.com/fo/lecture/2009_fellows_course/view_slide.php?slide_id=378)

8. Di Mario C, Sutaria N. Coronary angiography in the angioplasty era: projections with a meaning. *Heart* 2005;91:968-76.

9. Jeron A, Fredersdorf S, Debl K, Oren E, Izmirli A, Peleg A, Anton Nekovar A, Herscovici A, Riegger G, Luchner A. First-in-Man experience with the Magnetic Medical positioning system (MPS) for intracoronary navigation. *EuroIntervention* 2009;5:552-57.

10. Ernst S, Ouyang F, Linder C, Hertting K, Stahl F, Chun J, Hachiya H, Bänsch D, Antz M, Kuck KH. Initial experience with remote catheter ablation using a novel magnetic navigation system: magnetic remote catheter ablation. *Circulation* 2004; 109:1472-75.

11. <http://www.corindus.com/AboutUs/CompanyOverview.aspx>

12. <http://www.escardio.org/communities/EAPCI/about/Pages/committees.aspx>