

Subspecialty in Reproductive Medicine and Training in Reproductive Endocrinology and Infertility: An International Open Debate

Paolo Emanuele Levi-Setti^{1*}, Federico Cirillo¹, Valeria Scolaro¹, Giulia Elisa Gemma Mulazzani² and Pasquale Patrizio³

¹Humanitas Research Hospital, Department of Gynaecology, Division of Gynaecology and Reproductive Medicine, Humanitas Fertility Center, Rozzano (Milan) Italy

²Humanitas University, Rozzano (Milan) Italy

³Department of Obstetrics, Gynaecology and Reproductive Sciences, Yale University, School of Medicine, New Haven, Connecticut, USA

Introduction

Safety and efficacy of any complex operation, and medicine is no exception, should be anchored to the highest spheres of science, looking for new evidences and tools for improving clinical care with a special attention to women health as a fundamental part of gender medicine [1,2]. In medicine, professional (clinical) training overlaps with academic education, gained through basic medical, specialty, and subspecialty training aiming at optimizing the safety and efficacy of patient management [3]. When the subspecialty of reproductive endocrinology and infertility (REI) was formed within obstetrics and gynecology, the original focus was gynecologic and reproductive issues ranging from puberty through menopause. For example, understanding the complexity of hormonal mechanisms orchestrating the menstrual cycles has led to the identification of the hypothalamus, pituitary, ovary, and uterus axis allowing scientific progresses for both conception and contraception. Reproductive endocrinologists (RE) are consultants for complex gynecologic conditions such as management of hormonal dysfunctions such as hypo/hyperthyroidism, hyperprolactinemia; chronic anovulation and metabolic syndromes seen in polycystic ovarian disease, hormonal replacement therapy for menopause as well as fibroids, endometriosis, and abnormal bleeding. In addition to endocrinology, infertility is also part of the subspecialty training and expertise. In fact, Reproductive Endocrinology and Infertility (REI) specialists deal with the complexity of human reproduction and are experts in all the various forms of assisted reproductive technologies (ART's) including fertility preservation, embryology, genetics, andrology, micromanipulation techniques and microsurgical techniques including tubal surgery and surgery to conserve the ovary and the first experts in noninvasive surgery [4-7]. Our Fertility Center has been recently appointed by EBCOG and ESHRE as the first Italian Center for subspecialty formation in Reproductive Medicine and aim of the present editorial is further detail prospective and ongoing debate in education of board certified specialists in Obstetrics and Gynecology, devoted to Reproductive Medicine. This editorial would introduce the experience of a large tertiary care center adding to a debate of several European and American experts [8].

Aspects of Ob-Gyn Education in Different Countries

The European Society of Human Reproduction and Embryology (ESHRE) has been responsible for accreditation of the training in reproductive medicine in collaboration with the European Board and College of Obstetrics and Gynecology (EBCOG) [9]. These organizations are responsible to the Union of Medical Specialties (UEMS) which represents the European Union (EU) governing body for medical practitioners' education. However many countries within Europe do not have a specific national agency or a (RM) recognized national society that provides the necessary structure or governance for appropriate training in RM resulting in a trainee graduate who is recognized and allowed to practice in the domain of reproductive medicine as a fully qualified specialist. In Italy the five year residency program in Obstetrics and Gynecology, with directives from the Ministry of Health and University is structured as a 3 year basic,

general education followed by 2 years of full time training in fetal-maternal medicine, oncology or reproductive medicine. However this organization has not been implemented by most of our institutions. Moreover, the training in REI during the last two years of residency both clinical and research, is undermined by the reduced number of ART procedures performed in many Universities since larger IVF units are mostly in private practice, and by the growth of patient's claims for malpractice (limiting the "hands on" of in training residents in favor of senior attending).

In Europe, the subspecialist training program in RM was established by EBCOG and ESHRE in 1998, modified in 2004, and updated in 2013 by ESHRE [9]. By definition a RM subspecialist is a specialist in obstetrics and gynecology who has had theoretic and practical training in medical and surgical management of infertility, including assisted reproductive techniques (ART), and in reproductive endocrinology. In general, the comprehensive management of these problems includes diagnostic, therapeutic procedures, and audit of outcome. After completion of their training, subspecialists are expected to devote at least one-half of their working time to the field of RM. After 2 or 3 years of full-time training advanced knowledge and skills should be acquired in the following areas:

a) Advanced understanding of:

- i. Endocrine physiology, pharmacology of substances that regulate the reproductive systems, and the relevant aspects of the thyroid and adrenal systems;
- ii. The endocrine dynamics and ultrasound features of pregnancy and the menstrual cycle;
- iii. The physiology of conception and reproductive tracts related to fertility and reproduction in the female and male, aspects of basic and applied embryology and the techniques of in vitro fertilization, including assisted fertilization and assessment of sperm function;
- iv. Immunology and genetics related to reproduction;
- v. Psychosomatic aspects of reproductive endocrinology;

***Corresponding author:** Paolo Emanuele Levi-Setti, Humanitas Research Hospital, Department of Gynecology, Division of Gynecology and Reproductive Medicine, Humanitas Fertility Center, via Manzoni 56, 20089 Rozzano (Milan) Italy, Tel: +39-0282244505; Fax: +39-0282244699; E-mail: paolo.levi_setti@humanitas.it

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- b) Basic knowledge of:
- i. Clinical pharmacology of hormones;
 - ii. Gross and microscopic pathology relating to reproductive medicine;
- c) Capacity to interpret, perform and/or supervise endocrine laboratory diagnostic procedures with the relevant statistical methodology;
- d) Clinical competence in the management of endocrine and fertility problems, including:
- i. Diagnosis of pituitary, central nervous system, thyroid, and adrenal diseases relating to reproduction;
 - ii. Diagnosis and management of ovarian diseases related to reproduction;
 - iii. Biologic and chemical assessment of endocrine function related to reproduction, including experience in the performance and supervision of appropriate endocrine studies;
 - iv. Management of endocrine deficiency states including spontaneous and induced menopause;
 - v. Expertise in assisted conception, including ovarian stimulation and the management of ovarian hyperstimulation syndrome, sperm and ovum retrieval techniques, and management of their complications;
 - vi. Expertise in endoscopic techniques related to the diagnosis and treatment of reproductive problems;
 - vii. Experience in open and minimal access surgery designed to correct reproductive and particularly infertility problems, including an understanding of the role of tubal microsurgery;
 - viii. Fertility control and family planning;
 - ix. Expertise in ultrasound of the uterus and ovary to perform follicle tracking and diagnosis of early pregnancy and its problems;
 - x. Early pregnancy problems: clinical competence and detailed understanding of the differences in etiology and management of: Sporadic miscarriage and their complications; Recurrent miscarriage, diagnostic criteria, management, and counseling; Ectopic pregnancy and pregnancy of unknown location;
- e) Knowledge of:
- i. Administration and practice management;
 - ii. Teaching;
 - iii. Legal and ethical issues;
 - iv. Epidemiology, statistics, research, and audit.

In the USA the subspecialty of reproductive endocrinology in obstetrics and gynecology was fortunate to have had leaders such as Howard and Georgeanna Seegar Jones at Johns Hopkins, Leon Speroff and Nathan Kase at Yale, and Samuel Yen and Robert Jaffe at the University of California [8] and the subspecialty of REI (Reproductive Endocrinology and Infertility) was officially recognized by ABOG (American Board of Obstetrics and Gynecology) in 1972. The main difference with the European counterpart is that the REI Fellowship program is administered after a full, 4 years, residency in general obstetrics and gynecology. After residency a candidate for fellowship

has to apply to a particular accredited program generally within an academic center and fulfill an additional 3 years of dedicated training in REI. The fellows in REI learn endocrinology disorders ranging from abnormal pubertal development, recurrent miscarriage, polycystic ovary syndrome (PCOS), menopause, and, in some centers, contraceptive care and research. Laparoscopy and reconstructive surgery are also an important aspect of REI training. Training during the 36 months of fellowship in REI must include more than 12 months of direct clinical exposure including all aspects of ART and at least 18 months of exposure to research activities, and didactic education, including genetics, biostatistics and epidemiology [10,11].

Conclusions

The causes of infertility and treatment options vary somewhat in different areas of the world [12,13]. These differences, however, are minimal compared with those stemming from the financial, regulatory, and societal/ethical context of ART. Moreover, the training modalities in REI-ART duration of training, theoretical curriculum, methods to ensure competency, and certification processes differ greatly from country to country. Certain local restraints, such as financial measures regarding infertility and/or ART reimbursement and bans of certain practices, greatly affect the clinical management of infertility [3]. A proper training in the REI subspecialty is pivotal to offer the most advanced, effective and safe procedures to patients affected by either reproductive endocrine dysfunctions or in need of reproductive help. The training should prepare doctors for assisting patients who, due to local bans, seek cross-border reproductive care, including follow-up after returning home and care for any resulting complications. While the advent of IVF has decreased the use of surgical approaches and has weakened our subspecialty, it is true that many who practice "IVF" often elect to refer their surgical patients, this does not mean that as a specialty, we have given or should give up our gynecologic practice to others. One must underscore that there is a difference between the experts who elect to specialize in IVF and others who continue to practice the art of reproductive medicine, reproductive endocrinology, family planning, adolescent medicine, and minimally invasive surgery [14].

However, the training goals and the training opportunities are still fragmented and different among countries. International societies, such as the International Federation of Fertility Societies and International Federation of Gynecology and Obstetrics, should be urged to participate in the process of international standardization of training requirements and set minimal universal criteria to satisfy the breadth of knowledge, clinical training and certification processes. Our field is maturing, growing and starting to differentiate and it will be rewarding by finding ways to utilize this diversity to improve global reproductive health for all women [8].

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