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Pregnancy for female surgeons: an eternal challenge

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Medical career in Brazil has experienced the phenomenon of feminization. However, surgical specialties have not proportionally accompanied this growth. Among the factors supposedly responsible for the preference of young doctors for clinical specialties in detriment to surgical ones are the concern about having children, starting a family, and the need to reconcile the responsibilities and professional obligations imposed by the practice of surgery. This article brings an analysis of the problems involving pregnancy and the professional career of female surgeons, including their main occupational risks.

Female participation in surgical practice dates back to ancient history when the art of healing was closely linked to divine powers. Archeological records suggest practices equivalent to medicine practiced by Egyptian queens and Greek deities. In the Middle Ages, under strong religious influence, the practice of medicine by women, and in particular the surgical practice, was strongly discouraged and even prohibited, being viable only in exceptional cases, for example, when the profession was inherited from a deceased spouse. Women practicing acts of "healing" were at risk of being accused of witchcraft and sentenced to death[1].

With the arrival of the modern era, women still had less social participation. Perhaps, the first woman to practice surgery on the European continent was Margareth Bulkley. Records suggest that Bulkley was forced to assume a male identity (Sir James Barry, British army surgeon) as a way to graduate in medicine in 1809 in Scotland and to work in surgery without discrimination. Her true identity was discovered only after her death in 1865[1]. The title of first woman graduate in medical school in the world is credited to Elizabeth Blackwell, and it was in 1849 in the USA[2].

In Brazil, women were allowed only to attend regular university careers after the enactment of the Leôncio de Carvalho law in 1879. Before this date, wealthier families with avant-garde thoughts in relation to their daughters needed to send them abroad, as they did with Maria Augusta Generoso Estrela and Josefa Águeda de Oliveira. They were considered the first Brazilian female medical doctors, both having graduated from medical school in the USA in 1881 and 1882, respectively. The first doctor formally graduated as a medical doctor in Brazil was Rita Lobato Lopes in 1887. The first female surgeon to join the Brazilian College of Surgeons, the biggest and oldest association of surgeons in the country, was Mariza Garrido in 1959, only 30 years after its foundation[3].

Fortunately, the current scenario is very different from the past. Currently, in the United States of America, 37.1% of physicians registered at the American Medical Association are women[4]. In the United Kingdom, the percentage of women in medicine is even higher, which is 47.5% of the total number of registered professionals. However, when analyzing the percentage of medical specialists by gender, only 37% are women[5]. In the East, the number of women in medicine also continues to rise, but in a more discreet way. In the 2020 Japanese medical statistics, 23% of the country's medical force was represented by women[6].

Following the trend of developed countries, the medical career in Brazil has already experienced feminization. According to the data from the last Brazilian medical statistics, the female presence in medicine has increased by 50% in the last 20 years. Today, women represent 46.6% of the Brazilian medical force, which is mainly due to the younger generations, represented mostly by medical doctors under 34 years old[7].

Despite the increase of female representation in the medical field, surgical specialties have not been attractive to women. According to the data from the Brazilian Medical Association, only 23.4% of medical doctors registered as general surgeons are women[4]. Regarding the members of the Brazilian College of Surgeons, women correspond only to 17.5% of the total amount. However, most young female surgeons will be able to evoke in their memory some female exponent that inspired or encouraged their surgical career, from Brazilian female surgeons with international recognition to excellent anonymous professionals pulverized in remote hospitals in Brazil.

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Some factors have been pointed out as reasons for the female choice of clinical specialties to the detriment of surgical ones, and some of these involve the values and social characteristics of the new generations. The younger generations are endowed with independence and individualism, and value not only the financial return and personal satisfaction but also the quality of life in their professional choices.

The concern about having children, making a family, and the need to reconcile the reality of adult life with the professional responsibilities and obligations required by the surgical practice makes many female physicians opt for specialties with "more manageable daily lives" and without major "surprises"[8]. Perhaps, this explains the great female demand for clinical specialties such as dermatology (79.7% of women), pediatrics (75.6% of women), and endocrinology (72.1% of women), to the detriment of surgical specialties, such as urology (only 2.9% of women), orthopedics and traumatology (7.4% of women), and neurosurgery (9.4% of women)[9].

While female surgeons of the Baby Bommer generation (born between 1945 and 1964) were compelled to choose between motherhood and dedication to their professional careers, younger generations such as Generation Y (born between 1981 and 2000) and Z (born from 2000 to the present day) struggle with difficulties in balancing between professional life and motherhood.

In Brazil, when we analyze the general panorama of professional women, pregnant women have already achieved paid maternity leave for 120 days, which counts from the date of delivery and is extendable for another 60 days, guaranteed by the Consolidation of Labor Laws (Law nº 12514 October 28, 2011). Public employees are also supported by a similar law, guaranteeing 180 calendar days of paid leave. Since the 1980s, all pregnant women have the stability in their jobs, from the moment the pregnancy is confirmed until 5 months after delivery. They have also got the right to be relocated from the previous function, in case of activities that put risks to the health of the pregnant woman and her child (Law nº 6932 July 07, 1981).

Despite the support guaranteed by the Brazilian legislation, the medical activity in our country is based on the multiplicity and accumulation of employment relationships, in addition to the need for freelancer jobs. All those factors end up imposing difficulties on mothers who are also surgeons[7]. In some countries, such as the USA and the UK, the medical work tends to be in a single place, with well-defined working hours and the possibility of using daycares, facilitating motherhood among female surgeons.

A phenomenon often observed in new generations of surgeons has been late motherhood. Even though the medical faculty is the graduation with the highest number of hours and the longest duration in Brazil, the surgeon's long learning curve (about 3 years longer than that of clinical specialties) and the extensive workload have led female surgeons to postpone motherhood beyond the training period or even after consolidating their professional careers. According to the data from the National Center for Health Statistics, American female surgeons have their first child 7 years later than the general population, i.e., at an average age of 33 years[10].

Late pregnancy, work profile, and hostile environment lead female surgeons to have higher rates of assisted reproduction and pregnancy complications, such as miscarriages, premature labor, placental abruption, high blood pressure, and also complications for the child, such as growth restriction and low birth weight[11]. The surgeon's physical demands, such as night work, long working hours, and the need to stand during the surgery for many hours, were related to a higher risk of these complications. A survey carried out in the USA with 1021 female surgeons of the most different specialties found a complication rate during pregnancy of 35.3%, being 14.5% the percentage of complications during pregnancy in the general population[12]. In a recent study, it was shown that surgeons who operate more than 12 h a week during the last trimester of pregnancy are at greater risk of gestational complications compared to those who operate less than 12 h a week.

Surgeons are exposed daily to chemical, physical, and biological agents, which can endanger their pregnancy. In 2000, the Occupational Health and Safety Administration (OHSA) recognized the association between an increased risk of abortion and congenital anomalies related to the presence of volatile anesthetic gases in suspension in the surgical environment, such as nitrous oxide and halogenated agents. Currently, there are safety recommendations regarding the limit of exposure to residual gases in the operating rooms. Although the recommended levels vary internationally, a systematic review showed no adverse effects on pregnancy when any of the guidelines were followed and pressure ventilation systems were used in addition to laminar flow air conditioning[12].

Another risk associated with gestational complications is surgical smoke, which is the product generated by energy sources during surgery, as well as other toxins in suspension, such as benzene, 1,2-dichloroethane, and formaldehyde. All these risk factors can be minimized with the use of N95 masks[12]. Most guidelines also suggest that pregnant women be excluded from procedures where intraoperative hyperthermochemotherapy is performed due to the risk of miscarriage and congenital anomalies[13].

Advances in minimally invasive surgery have increased the use of intraoperative radiology. The development of hybrid operating rooms equipped with C-arm X-ray machines or CT scanners is a reality in many hospitals. The volume of endovascular procedures and angiography has increased by 400%

in the past decade[14]. Excessive exposure to radiation is related to the risk of miscarriage and fetal complications, with the first 2 weeks of pregnancy being the most critical. From the second to the eighth week of pregnancy, there is an increased risk of congenital anomalies and fetal growth restriction, and from the eighth week onward, excess radiation is associated with cognitive deficits and microcephaly. Intrauterine exposure to radiation is also related to late complications such as an increase in the incidence of childhood cancer[15]. In Brazil, the Basic Radioprotection Guideline (CNEN NN3.01), regulated by the Ministry of Labor (ordinance MTB 1084/2018), follows the recommendation of the International Commission for Radiological Protection and determines that pregnant women should not receive an effective dose greater than 1 mSV. The use of glasses and lead aprons that cover from the neck to the knee as individual equipment and the use of specific dosimeters that control radiation exposure are also recommended[16].

Although studies related to the health preservation of the pregnant woman and the fetus in the surgical environment are increasingly frequent, it is necessary that structural changes in the social and labor organization also occur. Stipulated measures that support surgeons of childbearing age to become pregnant without the stigma associated with pregnancy, especially during medical residency, are important and cathartic for the new generations. This long road of changes has already begun when we observe a reorganization of social values with greater participation of men in daily domestic activities, technological facilities of modern life (programmable appliances with remote control), and advances in science (egg freezing, fertilization-assisted clinics, gamete bank, etc). All these tools have been important to harmonize the life expectations and desires of female surgeons.

By analyzing the past, many improvements were achieved. By projecting the future, new challenges will arise. However, one thing is certain, i.e., there are no limits to the aspirations and fulfillments of the strong women who chose to pursue a surgical career in this country.

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