Progress on Folate Supplementation and Spina Bifida Prevention

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"Prevention is the best treatment even better than cure"

Medicine is nowadays much more devoted to treat than to prevent disease. The World Federation of Neurological Societies (WFNS) is a professional nongovernmental organization consisting of around 50,000 neurosurgeons. During the WFNS presidency of Prof Dr. Franco Servadei, 2017–2021, I was honored to run the Pediatric Neurosurgery Committee and it was a great privilege. This also provided me with an opportunity to choose what I deemed necessary to focus on needs of pediatric neurosurgery around the world. The immense need of work in the field of spina bifida (SB) and trauma made it easy for me to choose the two and work on their prevention strategy! In each pediatric neurosurgical course, meetings, webinars, hands on, we spread this knowledge and created awareness among as many colleagues as we could. With less or absence of financial support, physical meetings on the first years and online after the coronavirus disease 2019 pandemic came over, promoting SB prevention in low- and middle-income country, formed the content of main lectures. The neural tube defect (NTD) prevention and trauma was the hot topic on the Pediatric Neurosurgery Committee at the WFNS. The mission chosen was accomplished to a great extent.

SB is the most complex central nervous system malformation compatible with long survival and for over 30 years it has been known that dietary supplementation and flours fortification with folate reduce its incidence in up to 70% of cases. Today, it is known that NTD is present across the world. The SB is the most common NTD and are multifactorial, genetics, environment and nutritional, but folic acid has an important role during the neurulation period. One of the known causes of not closure of the neural tube is the folate deficiency in the mother before and during gestations. The NTD occurs during the third-fourth week of gestation. Eating healthy foods, even the richest in folate, is not enough to prevent SB.

Fertile women are capable of becoming pregnant and it is well known that the planning of gestation corresponds to only around 50% of the new born. The other halves of pregnancies are not planned. Based on this consensus information, it is recommended that women should take folate from the menarche to the menopause. Considering that even the most educated people have this information and yet fail to act on for daily intake of folate, therefore it is empirically acceptable that this strategy can achieve only less than 20% of the planned pregnancy for SB prevention. This individual strategy is not enough for SB prevention. Scientifically proven and much more economical, the most accepted prevention is the fortification of food.

Fifteen years ago, only 50 of the more than 200 countries in the world had some kind of food fortification. Now we have reached to around 100 countries. Anyway, there is a lot more work to be done.

Recently, in 2021, the International Society of Pediatric Neurosurgery with almost 500 members worldwide made a statement on mandatory folic acid fortification of staple foods for the prevention of SB and anencephaly. This year, the World Health Assembly published an urgent call to action for universal mandatory food fortification with folic acid.

The SB-associated anomalies are related to the brain, spine, and orthopaedic, urinary and gastrointestinal system with involvement to different degrees of lower limbs. Multidisciplinary follow-up is for life. In the last decade, fetal medicine, with the improvement of antenatal diagnosis, made a lot of progress on SB antenatal repair but postnatal repair is still the standard treatment worldwide.

Fetal surgery, for myelomeningocele repair, improves some manifestations like Chiari II, hydrocephalus, cognitive functions, and functional level of the lower limbs, but is not curative. Prevention is still the key.

In the last years, fortunately social media, families, and health professionals are working together to decrease the incidence of NTD. The focus should be in spreading information, education, and actions on SB prevention together with governments, health and economy ministers. The basic food fortification is at the top of the goals.

Some considerations need to be done about the industrialization of food and fortification strategy. For those people that are living in the more rural areas or far from urban centers with the food based on hand made flours, other strategies can be planned. Salt fortification or other options can be the next research projects.

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