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EDITORIAL

The evolution of nutritional support in Mexico

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This paper is dedicated, with the utmost consideration, esteem and respect, to the eminent Academic Luis Ize Lamache, illustrious figure in surgery in Latin America and pioneer in the field of surgical metabolism and clinical nutrition. I remember well those early years when Luiz Ize and other visionaries began clinical nutrition and we created the first nutritional support services in Latin America. I thank the Mexican Academy of Surgery for inviting me to organise, coordinate and publish a posthumous tribute to the academic Dr. Luis Ize Lamache (Fig. 1).

From the first steps in 1969[1] until today, our patients have received nutritional support for 47 years. Over the years we learned that following a strict protocol was essential when preparing solutions, implementing and monitoring our approach, as well as controlling patients' cases, especially critically ill patients undergoing intravenous feeding, if success with procedures was the objective. This message became a paradigm and the majority of locations that applied nutritional support have complied with these rules.

Throughout these years we have seen an explosion of nutritional support, intravenous, enteral or mixed, and we can say that every second level health care hospital in Mexico has the appropriate professionals and means to administer it.

Figure 1 Academic Dr. Luis Ize-Lamache.

Intravenous feeding

The biggest stimulus for intravenous feeding was, without a doubt, the opening of outpatient mixture laboratories under the responsibility of pharmaceutical companies (Pisa, Baxter) where mixtures were produced by qualified personnel and under optimal conditions, ensuring sterility and stability. Simultaneously, other institutions or private companies implemented mixture laboratories for the preparation of solutions or cancer medications, and by April 2014 there were 28 mixture laboratories around the country (Table 1), with sanitary licences since December 2000 granted by the Federal Commission for the Prevention of Health Risks (COFEPRIS). These mixture laboratories are found in almost all major cities in Mexico and can, at a given time, send mixtures to hospitals located in other cities, eliminating the need for hospitals to have a laminar flow hood and specialised personnel.

Another important change is the implementation of silicone-elastomers, polytetrafluoroethylene and medical-grade polyurethane catheters, which replaced semi-rigid polyethylene catheters that had large-bore needles and

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Table 1 Mixture laboratories with sanitary licences granted by the Federal Commission for the Prevention of Health Risks (COFEPRIS) since December 2000 to April 2014

Mexico City	9
Guadalajara	2
Monterrey	3
Culiacan	2
Jalapa	1
Tijuana	1
Morelia	1
Hermosillo	1
Villahermosa	1
Puebla	1
Torreon	1
Toluca	1
Tampico	1
Merida	1
Chihuahua	1
Leon	1
Total	28

sharp edges, which presented real threats of rupturing the catheter, pricking a section of the catheter with the needle and piercing the vein. Currently we have catheters made of the following materials: silicone-elastomers, polytetrafluoroethylene and medical-grade polyurethane, which are soft and well tolerated by the patient. With the Seldinger technique for percutaneous puncture, fine needles and needle guides, access to the subclavian veins has become a safer and better tolerated procedure in the long term. Subcutaneous ports in their various forms have simplified access to the vein and care for the catheter, both for intravenous feeding and for the administration of antibiotics or chemotherapy with minimal discomfort to the patient and with a good safety profile when catheter care protocols are respected.

These are perhaps the solutions that have experienced the fewest changes, with the emergence of amino acid solutions enriched with electrolytes or dipeptides capable of releasing glutamine, arginine, histidine or branched chain amino acids. In lipids, olive oil and 50/50 mixtures of long- and medium-chain fatty acids have been added to the traditional Intralipid®, with the possibility of enriching the emulsions with fish oil rich in omega-3[2].

Finally, intravenous feeding adapts better to the "metabolic time" the patient experiences in critical condition (burned, septic, severe acute pancreatitis) by modifying the proportion of calories from carbohydrates and fats and increasing, if necessary, the contribution of amino acids. In the management of acute renal failure, it has been understood that it is more important to keep the patient in good nutritional condition even if there is the need to advance the dialytic procedures[3].

Enteral nutrition

In this field of nutritional support we have witnessed an explosion of enteral formulas, many of them founded on theoretical aspects of nutrition, and thus not representing a clear benefit for patients, but the desire for pharmaceuticals to take over a market. The list of formulas lengthens daily and it would be prudent for the health team responsible fornutritional support to be well-acquainted with them: their advantages, limitations, and costs.

These past 45 years have shown that enteral nutrition is a safe procedure that can be initiated early in the critically ill patient as long as strict adherence to the protocols this procedure requires are complied with to avoid complications since the method has, generally, a lower frequency of infectious complications than intravenous feeding. Both methods have their indications and limitations although they are often used sequentially or mixed.

Enteral probes have improved considerably as well as infusion pumps with the probe's intermittent automatic washing systems.

During these past four decades, nutritional support has become an integral part of patient treatment, with its intravenous feeding or enteral nutrition modalities, which has reawakened doctors' interest in the importance of nutrition as a therapeutic methodology. We owe the integration –in most schools and medical faculties in Mexico– of the chair of clinical nutrition. In addition to furthering health professionals' knowledge of nutrition, the responsible person must have the integrity of continuously updating their knowledge of this science and stimulating research into new solutions to resolve relevant nutritional support problems.

Conflict of interest

The authors declare no conflict of interest.

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