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RESEARCH ARTICLE

NUTRITIONAL NEEDS AND INTAKES IN THE BURN VICTIM IN OUR CONTEXT: A STATE OF PLAY

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Abstract

Nutrition in burns is a separate entity and an integral part of treatment. The internal route should be favored because several studies report on its effectiveness and the benefits it brings: it preserves the secretion of gastrin, preserves intestinal motility, it prevents intestinal damage of the Ischemia-reperfusion type, increases intestinal permeability, it decreases the secretion of endotoxins and mediators of inflammation, and keeps the mucous barrier functional. The main objective of our study was to assess the nutritional needs and intakes of the patients taken care of within our resuscitation of burns, both quantitatively and qualitatively then to draw recommendations for improving their supported. We included 60 burned patients in our study. We included 60 burned patients in our study. All of our patients had a SCB greater than 20% at admission. The average interval between burns and the start of feeding is 1 day and 6 hours post burn. The enteral route is the route of choice in our series with 96% of patients being fed orally. Nutritional requirements are calculated using formulas recommended by the ESPN guide. The calculated needs are greater than the contributions actually received, especially during the first 3 days after burning. The overall consumption of ingestants is reduced in children while normal consumption is found in adults. Adults eat nutrients fairly orally, while children eat less meat and starch, and prefer dairy products and easy-to-drink fluid solutions. Most patients required supplementation such as powder and liquid solution in order to arrive as needed calculated. 70% of our patients presented with digestive intolerance which was based on nausea, loss of appetite and transit disorder a type of constipation. Weight losses of up to 15% of the initial weight have been observed in our series in both adults and children. It is very difficult for severe burns to provide enough calories orally, especially during the acute burn phase.

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Introduction:-

The burned patient presents a certain number of peculiarities which influence his energy expenditure and his nutritional needs: loss of the cutaneous barrier which exposes to thermal, fluid losses and increases the risk of infections. Early and abundant fluid resuscitation, sometimes exposing you to the risk of excessive intakes which

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can lead to complications. Energy and protein requirements are increased due to hypermetabolism resulting from the endocrine reaction associated with the burn. The digestive tract is attacked and yet it is important to keep it functional. There is a well-documented deficit in micronutrients, with in particular recent work concerning vitamin D. Nutrition constitutes an entity in its own right forming an integral part of the care of these particular patients. The vicious cycle of undernutrition, lack of healing, reduced immune defenses - infection - undernutrition must be broken. On the other hand, aggression and the subsequent inflammation are factors that increase metabolic needs and not taking them into account will lead to acute undernutrition, with re-initiation of the vicious circle. The goal of nutritional intake in burn patients is to slow down hypercatabolism, increase immune defenses, prevent sepsis, and speed up healing. In our context in Morocco, the majority of burn incidents leading to serious burns occur in the regions located several hundred kilometers from our burn burn resuscitation center. Thus, there is a delay in the overall management of the patient, leading to a delay in the administration of food, which is already starting at an early stage the vicious circle of undernutrition in severe burns. A big problem in our context and also that there is today no nutritive solution that can alone meet the need for burns. The objective of our study will therefore be twofold: on the one hand to assess the needs and nutritional intake of our burned patients, and on the other hand to set up a nutritive solution capable of covering the energy needs of the burned person and easily reproducible by carers at home.

Materials and Methods:-

This is a retrospective study carried out within the intensive care unit of burns victims of the Mohammed VI CHU in Marrakech over a period of 1 year and 6 months from June 2018 to December 2019.

A total of 60 patients with severe burns were included.

The inclusion criteria were: a SCB > 20%, age both adults and children; Burn patients admitted before H48 post burn. Nutritional requirements are calculated according to the recommendations of the European Society for Clinical Nutrition and Metabolism (ESPEN) guideline. We used the "Curreri" formula for adults and the "Schoffield" formula for children. All of our patients were fed enterally (NE) or parenterally (IV) when a major digestive intolerance was present or when the enteral nutrition was not sufficient. Patients received hospital meal trays each containing 1100 Kcal associated or not with supplementation such as Promax powder or Fortimel liquid solution. Nutritional intake monitoring was done by measuring the weight curve with a weekly weighing and measuring the albumin level in the blood (the other biological monitoring markers are not available in our center). Digestive intolerance was defined on the basis of purely clinical criteria such as abdominal pain, vomiting or transit disorders. At the local level, all our burns benefited from regular dressing changes with the same protocol based on flammazine associated with vaseline tulle applied to burns after careful cleaning with saline serum.

The epidemiological, clinical and paraclinical information and the follow-up of the patients was done using a nutritional evaluation form which was filled in for each patient (Appendices 1). The data is collected and analyzed using Microsoft Office Excel software.

Results:-

Epidemiological characteristic:

A total of 60 patients were included in our series. The average age is 29 with a minimum of 5 years and a maximum of 80 years. There is a male predominance with 70% of male patients compared to 30% of women. Regarding the origin of our patients, there is a clear predominance of rural origin for a minority from large cities. The most common burn mechanism is thermal butane flame burning in adults and scalding in children.

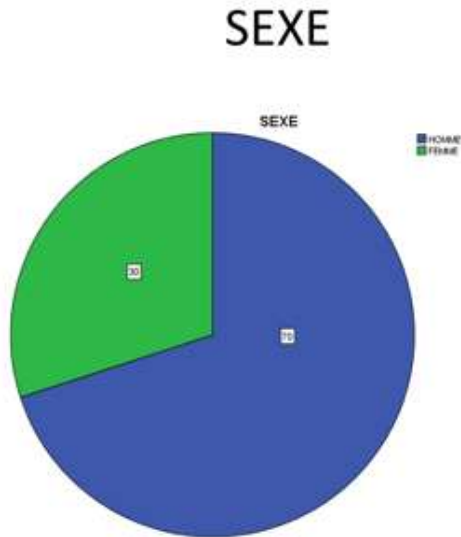


Figure 1:- Age of patients Figure.

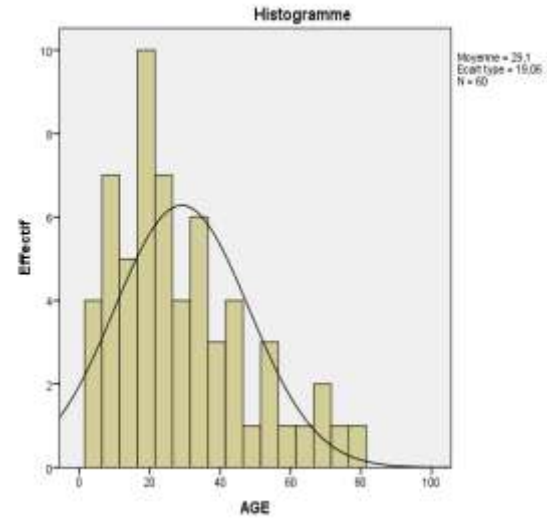


Figure 2:- Sex of patients.

The average length of hospital stay is +/- 16 days.

Clinical characteristics and nutritional contribution:

All of our patients had a SCB greater than 20% on admission with an average SCB of 29%. All of our patients were admitted before H48 post burn with an average delay between the burn and the start of feeding at 1 day and 6 hours post burn. The average body mass index on admission for adults is 25.2 and 19.19 for children. All our patients received their nutrition by enteral route with 96% by oral route and only 3.33% by nasogastric tube.

In quantitative terms, the nutritional requirements calculated according to the "Curreri" formula for adults is 3175 Kcal / day, and 1507 Kcal / d for children. Among our adult patients, 90% of them received 3 hospital meal trays / day while 10% consumed only 2. In children, we see that 40% of them only consume 2 meal trays / day. We therefore see that the calculated intakes are more important than the needs actually provided by the patient and they are around 65% of the calculated intake for adults and 70% of the calculated need for children.

Qualitatively, the diet was solid in 60% of the cases, mixed in 35%, liquid by gavage in 10% of the cases. Adults consume more or less fairly as well meat, starchy foods, dairy products as vegetables which are considered "consumed" in a normal way in a little more than 60% of the cases. In children, we find that meat, starchy foods and vegetables are moderately consumed or not consumed in more than 50% of them and only dairy products are normally consumed for 55% of children. Weight loss was observed, with an overall average of 6 kg lost between admission and discharge, and weight loss of 5.5 kg in adults and 7.5 kg in children, respectively.

Albumin levels were low both on admission and on discharge with levels of 28 on entry and 26 on exit. However, the measurement of this parameter is biased because all of our patients were transfused with albumin 20% when the rate was below 25.

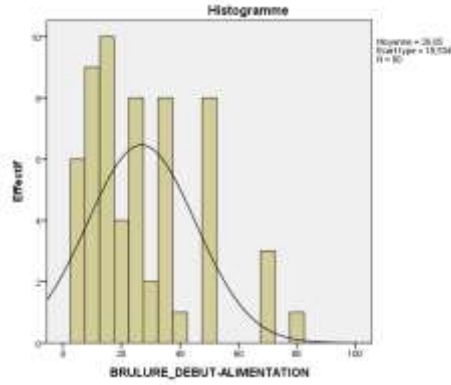


Figure 3:- Mean interval between burn injury and start of nutrition.

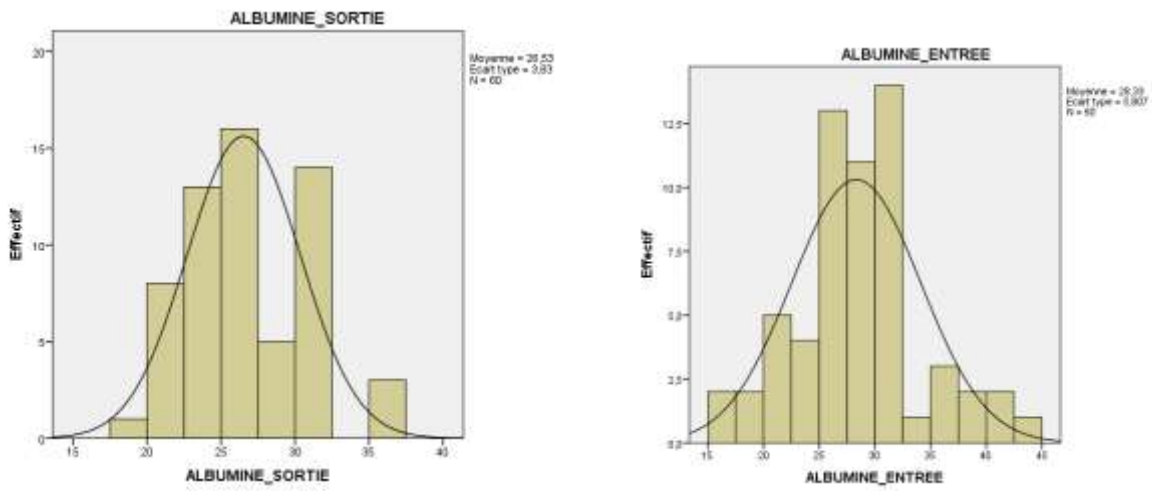


Figure 4:- Albumin levels at admission and at discharge.

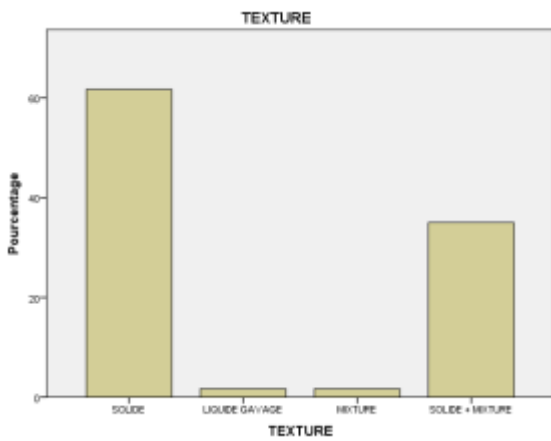


Figure 5:- feeding mode

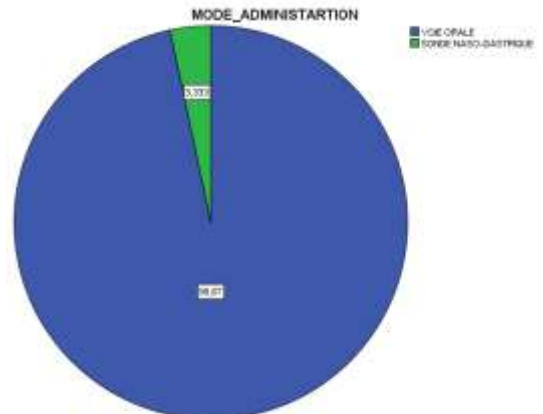


Figure 6:- Texture distribution.

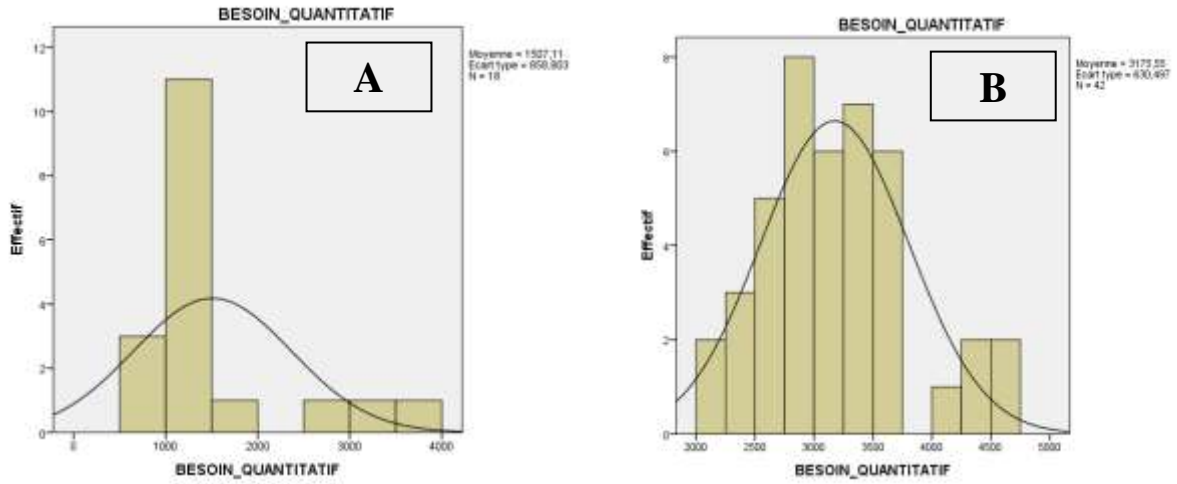


Figure 7:- Quantitative requirement in adults (A) and children (B).

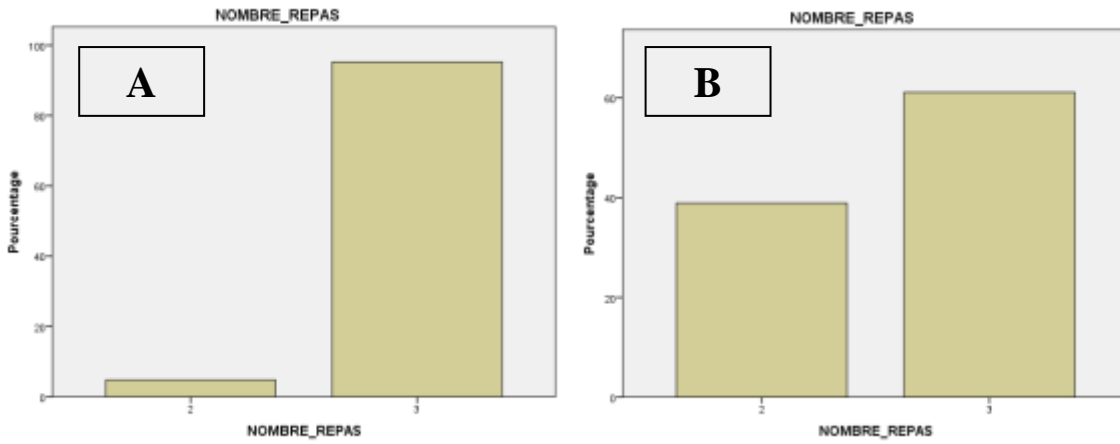
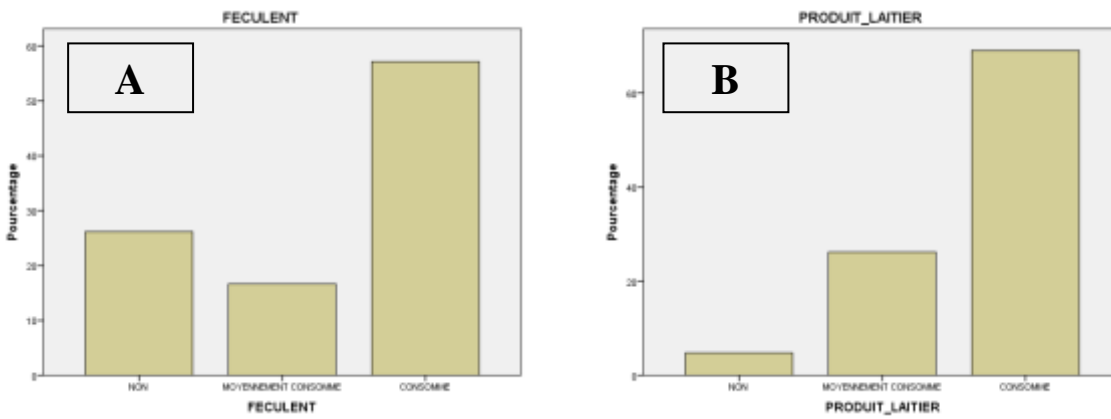


Figure 8:- Number of meals (adults A and children B).



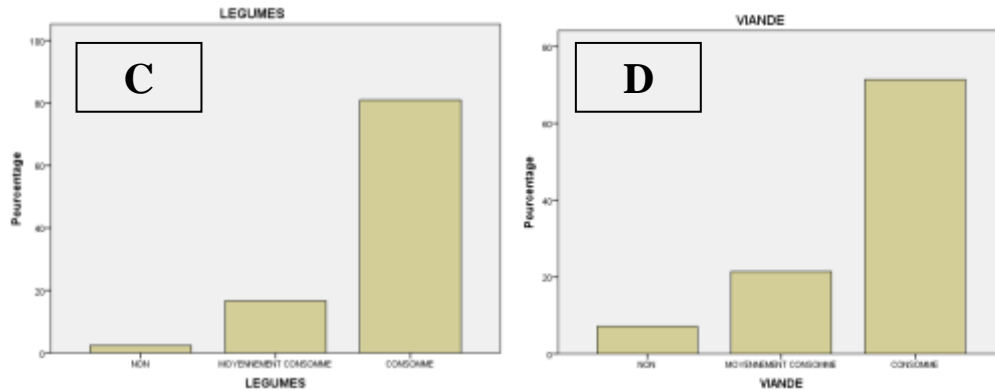


Figure 9:- Consumption of ingestants in adult patient (A= dairy products; B= Starchy; C= meat; D= vegetables).

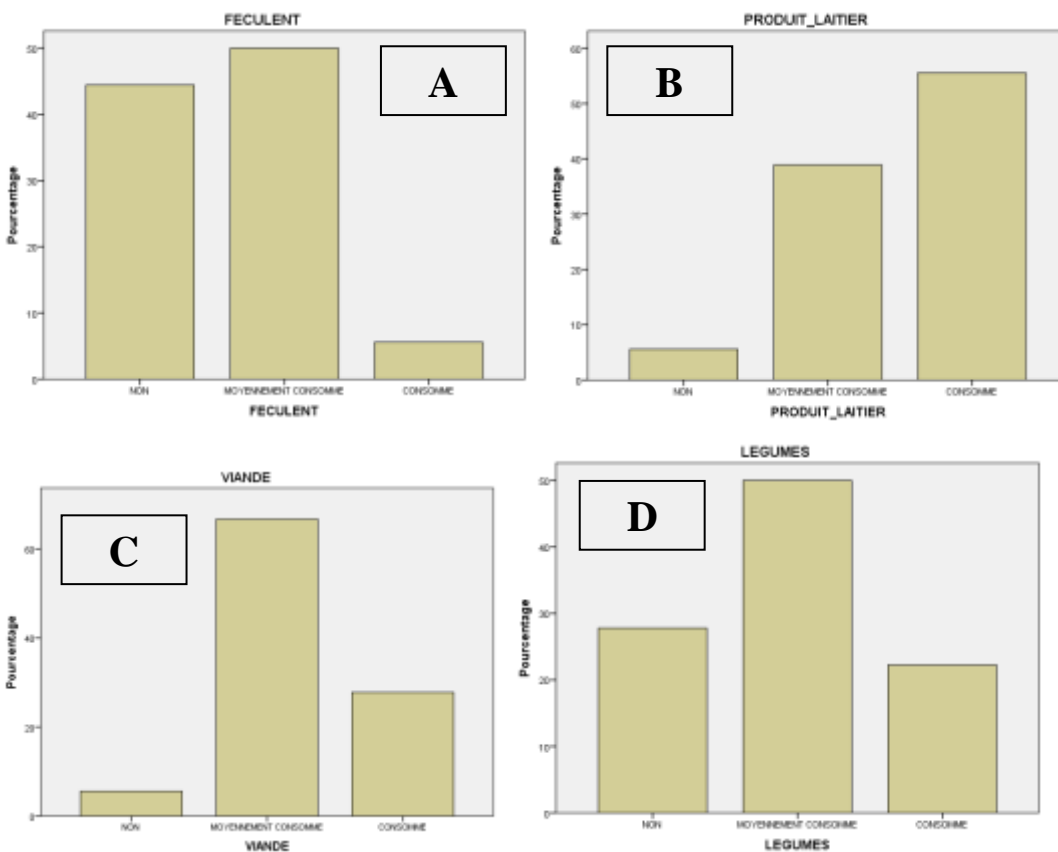


Figure 10:- Consumption of ingestants in children (A= dairy products; B= Starchy; C= meat; D= vegetables).

Digestive intolerance:

Of our 60 patients, 46 or 78% developed digestive intolerance, a type of transit disorder and abdominal pain. These intolerances have been treated symptomatically and according to severity with the help of oral medications.

Discussion:-

What is the context of the serious burn patient? Increased caloric needs, carbohydrate intolerance, exacerbated nitrogen catabolism, use of lipids which can worsen the inflammatory reaction, a digestive tract a priori functional but not always effective and it has been known for a long time that overeating is not the solution.

Food plays an indisputable role in severe burns, especially since it was introduced early. Nutritional treatment in burn patients will therefore have as main objective to slow down hypercatabolism, respond to the increase in basal metabolism and the demand for energy and nutrients; control hypercatabolism and maintain lean body mass; promote metabolic control by limiting, for example, hyperglycemia or the impact of catecholamines and finally supporting the immune system.

In our series, the oral route represents the main route of feeding burned, unlike other studies () or the enteral route by nasogastric tube is the preferred route of burned because it allows a greater amount of calories to cover the increased needs of the patient. We found that it was difficult for the burner to provide adequate calories orally, especially during the acute phase of burns and those up to 4 to 5 days post burn.

Few studies have reported actual nutritional intake by mouth for burn patients. In our series we noted a reduced consumption of starchy foods, vegetables and meat in children thus aggravating their protein and calorie deficit. This suggests that a balanced, high-calorie liquid nutrient solution including the trace elements necessary for burning will be easier to ingest and will cover the needs, especially in children in whom solid food is reduced, and even more so. burn background.

We emphasized in our series that all of our patients started their diet on average 2 days after the burn, but numerous studies have shown that enteral nutrition (NE) is to be preferred and to start within 12 hours of the burn. This NE, even covering only 15% of intakes (very variable from one patient to another and during the course of a patient's evolution) helps maintain intestinal trophicity and improves patient immunity. Burn victims suffer from intestinal ischemia at an early stage, edema of the digestive walls, abdominal compartment syndrome and gastroparesis, more frequent in the event of late onset of NE, almost systematic beyond 40% of SCB. In our series, the patients were fed by hospital meal trays containing 1100 kcal and made up of Carbohydrates: 65% of the AET; Fat: 40% of total energy intake; Proteins: 15% of the AET with a variable composition (Rice + meat + vegetables / pasta + chicken +/- yogurt). The recommendations according to several studies concerning nutrition are to distribute the nutrients as follows: Carbohydrates must represent 55-60% of the total energy intake (without exceeding 60%) and without exceeding 5mg / kg / min both in the adult than in children. This will make it easier to get transplants, reduce infectious complications and significantly reduce mortality. Proteins should account for 10-20% of total energy intake. In burned adults, protein requirements are between 1.5 and 2.5 g / kg per day. Glutamine is an essential amino acid in burns, it will reduce the risk of infection, the length of stay and costs, accelerated healing. The dose required to achieve clinical impact is 30 g / d.

Food intolerance is a common problem in burns. The study by FengmeiGuo (1) noted 32% of cases of digestive intolerance such as abdominal pain, diarrhea, vomiting. The risk factors for digestive intolerance found are sedation, the use of catecholamines, the depth of burns and overeating. In our series, 73% of digestive intolerance is noted, which is a very high rate and the patients who presented these symptoms all have deep burns of 2nd deep and 3 degrees.

Conclusion and Recommendations:-

Metabolic changes in burn patients have been known for a long time and are specific to this pathology. They are suitable for the defense of the body and for tissue reconstruction, but can lead to cachexia, delayed healing and death. The focus must be more on the quality of the nutrients than on their quantity. It is the concept of immunonutrition (supplementation with vitamins and trace elements, glutamine, arginine, Ω 3 acid and reasoned control of blood sugar) which was recently proposed to reduce the oxidative stress and the inflammation caused by the accident. Nutritional monitoring is essential and contributes favorably to the healing of burns.

So according to these observations we can and have formulated a nutritive solution to cover the needs of the burner and containing all the minerals and vitamins necessary for healing. This solution (appendices 2) is liquid and can be fractionated and administered by nasogastric tube after sieving. This solution has the advantage of being balanced, high-calorie, and above all easy to use and reproducible at home by accompanying the burner who can reproduce it at home. Finally, it is a nutritious solution accessible financially which is an important parameter in our context where patients often come from a disadvantaged environment. These benefits and effects on wound healing and overall burn survivorship will be the subject of another section which will be studied.

Nutrient solution formulas:**Ingredients:**

1. Mixed soup
2. 50 g of powdered milk
3. 200 g of potato
4. 100 g carrot
5. 100 g pumpkin
6. 300 g chicken breast / Fish
7. 30 g of olive oil
8. 50 g of oatmeal
9. Glutamin (origin : meat, eggs, spinach)
10. Energetic value = 1500 Kcal
11. Possible via nasogastric tube
12. Split on 24h ++

Energetic value:

1. Protein : 93 g (= 30 % de l'AET / N= 20-30%)
2. Fat : 46g (= 18 % AET)
3. Carbs : 106g. (45% AET)
4. Vitamin C : 8.24 mg
5. Vitamin K1 : 38.59 µg
6. Selenium : 49.8 µg
7. Magnesium : 158.6mg
8. Vitamin E : 8.42 mg
9. Zn : 4.38mg
10. Vitamine D : 0.58 µg
11. Iron : 3.17 mg

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