CURRENT GUIDELINES ON THE IMPLEMENTATION OF MOLECULAR ADSORBENT RECIRCULATING SYSTEM - MARS

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[Attuali orientamenti sull'attuazione del molecular adsorbent recirculating System - Mars]

SUMMARY

The authors propose to focus on an artificial liver support system introduced into clinical practice in the 90s. This is a dialysis system that uses albumin dialysis to remove toxic substances related to albumin.

In particular, they mention the use of such treatment for Amanita Phalloides poisoning and report a case which occured according to their observation.

They concluded that the Molecular adsorbent recirculating system (MARS), even if lacking in clinical experience, is still a valid technique.

Key words: Mushroom poisoning, hepatic failure, renal failure, hepatic encephalopathy, hepatic recirculation system, liver transplant

RIASSUNTO

Gli autori si propongono di attenzionare un sistema di supporto epatico artificiale introdotto nella pratica clinica negli anni '90. Si tratta di un sistema di dialisi che utilizza dialisato di albumina per rimuovere le sostanze tossiche legate all'albumina.

In particolare si soffermano sull'utilizzo di tale trattamento nell'avvelenamento da Amanita Phalloides e riportano un caso occorso alla loro osservazione.

Concludono affermando che il Molecular adsorbent recirculating system (MARS), anche se l'esperienza clinica è ancora scarsa, risulta una tecnica valida.

***Parole chiave**: Avvelenamento da funghi, insufficienza epatica, encefalopatia epatica, sistema di ricircolo epatico, trapianto epatico*

Introduction

Amanita Phalloides poisoning represents an increasingly common and potentially fatal problem. It is estimated that this fungal species is responsible for 90% of all deaths (from fungal poisoning).

The clinical picture is characterized by an initial phase consisting of gastrointenstinal disruption followed by a hepatic phase characterized by severe hepatic impairment which may lead to death. At this later stage the laboratory framework suggests: an increase in hematocrit, hypoglycemia, azotemia, abnormal electrolyte markers, increased transaminases, hyperbilirubinemia, direct and indirect hypoprothrombinemia.

In these cases it is important to follow the correct treatment protocol in order to restore normal laboratory paramteters. However, if this approach doesn't bring about positive results one may have to resort to a liver transplant which remains the definitive tretment for select patients. Conventional hemodialysis techniques have little or no effect on liver detoxification and therefore do not improve the prognosis in these patients.

MARS (molecular adsorbent recirculating system) is the most widely developed system which is based on the selective removal of toxins from the blood bound to albumin.

A recent study conducted in Finland suggests that treatment with MARS is the least expensive and above all most effective therapy. It can be used for the recovery of natural liver function or as a bridge to liver transplantation.

MARS is an artificial liver support system, introduced in clinical practice in 1993. It is intended to purify the blood from metabolic waste products

normally metabolized by the liver. This is essentially a modified dialysis system that uses albumin dialysis to remove toxic substances related to albumin, such as bile acids, fatty acids and bilirubin.

The design of such a device is not as simple as it sounds, because most of the toxins (except for a few, such as ammonia and lactate, which are soluble in water) are linked to proteins, usually albumin. They cannot be removed by hemodialysis or simple hemofiltration (as opposed to renal failure), but are potentially extractable by albumin dialysis, whereby blood is dialysed against albumin solution contained in a suitable membrane. The toxins bound to albumin should be made by binding sites for albumin in the dialysate and thus removed from the blood.

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The conditions that allow us to apply this re-circulation system are: Wilson's disease with acute hepatic failure bridged to liver transplantation, acute liver failure from drug poisoning, mushrooms, etc..

We will report the case of a 39 year old woman treated with MARS.

Case report

The patient was hospitalized because of profuse diarrhea, nausea and abdominal pains.

The patient presented an changed general conditions, systemic pressure of 90/55 mmHg and heart rate of 120/min.

The blood exam showed ALT 5.022 Ul/L, bilitubinaemia 7.18 mg/dl, PT 90.4/s, hyperammoniaemia.

These conditions are suggestive of severe hepatic malfunction: encephalopathy of second order.

So Gastric lavage was executed and activated charcoal was administered with a saline catharsis in order to remove gastric material, moreover penicillin G and silibin were administered because they have hepato-protective effects, in fact they have a key role to prevent absorption of the amatoxins. In addiction vitamin K and plasma were administered to prevent severe clotting. Next the MARS approach was used due to evident hepatic compromise.

After the primary cycle of treatment the patient's conditions were improved, in fact the MARS approach had an immediate effect with important reduction of ammonia levels, ALT, PT, I.P. (from 18 to 11 mmHg), jugular venous saturation (from 86 to 68 mmHg) and with a good increase of cerebral perfusion pressure (from 42 to 58 mmHg).

The positive improvement of the patient's conditions is due to reduction of ammonia level in the blood and of bilirubinaemia.

Conclusions and consideration

Experience has successfully shown that this method represents a valid system that leads to a rapid reduction in both amonia levels in the blood as well as albumin levels in the serum in all cases characterized by sever hepatic dysfunction associated with systemic encepthalopathy.

It is therefore a technique not to be underestimated which can aid greatly in the detoxification of the liver in the case of Amanita Phalloides poisoning.

Liver transplantation represents the gold standard in the management of these pantients, but despite significant progress in intensive care, the management of these patients is difficult and not without complications and thereby posing a high risk of mortality. It would appear that this technique, while still being perfected, could become a viable alternative to liver transplantation.

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