MUSHROOM POISONING

RITA AZZOLINA, GIUSEPPA LA CAMERA*, LIVIO SALVATORE FIORINO, FEDERICA CHIARENZA, ALESSIA DI FRANCESCO, MARCO CAVALERI, DESIRÈE VIVIANA NAVARRIA, MARIA CELESTRI, MAURO ORAZIO COCO**
University of Catania - Department of Surgery: Anesthesia and Intensive Care Unit, Policlinico Hospital, G. Rodolico Catania (*Chair of research: Prof. Rita Azzolina*) - *Azienda Ospedaliera Universitaria Policlinico " Gaspare Rodolico", Catania, Dipartimento: Specialità Medico-Chirurgiche - **C.C.D. "G.B. Morgagni", Catania

[Importanza del periodo di incubazione nell'avvelenamento da funghi]

SUMMARY

The authors consider the importance of the mushroom poisoning incubation period.

They focus on the short and long incubation syndrome. They stress the necessity of a well-timed rehydration treatment, and assert that in these cases it is important the hospitalization for the water and electrolyte replenishment to prevent the cardiogenic shock which could increase the mortality incidence.

Key words: Incubation, toxicity, hepatorenal failure, cardiogenic shock, rehydration

RIASSUNTO

Gli autori valutano l'importanza del periodo di incubazione nell'avvelenamento da funghi.

Si soffermano sulle sindromi a breve incubazione e su quelle a lunga incubazione. Puntualizzano la necessità di un trattamento di reidratazione tempestivo e concludono affermando che in questi casi risulta importante l'ospedalizzazione per il reintegro idrico-salino al fine di evitare il collasso di circolo che potrebbe aumentare l'incidenza di mortalità.

***Parole chiave**: Incubazione, tossicità, insufficienza epato-renale, collasso cardiocircolatorio, reidratazione*

Introduction

An important parameter to regard about poisoning syndrome is the time of incubation (or latency) which represents the average time that separate swallowing from first symptoms onset. We distinguish two categories: early or with short latency syndromes, when the first symptoms come within 6 hours from swallowing; late or with long latency syndromes, when the first symptoms come with 6 hours of delay from swallowing. Generally, the most serious poisonings are the long incubation ones, in fact they have the greater incidence of mortality; this happens due to at least two motives: if it is late syndrome, the medical intervention is difficult because seriously concerned organs can be several, inasmuch mycotoxins were able to circulate into the organism; if the delay of the first symptoms is about many hours, the same poisonous mushrooms are consumed in following meal with the consequence that the symptoms often take back to distance of time, with toxic effects that overlap to more resumptions damaging the interested organs more and more.

Short-term incubation syndrome

The short-term incubation poisoning is characterized by low organ toxicity, symptoms occur in a period less than 6 hours after ingestion of the fungus. The short-term incubation poisoning can be differentiate in:

• *Muscarinic syndrome*: it is caused by the ingestion of Clitocybe containing muscarine, a toxic acting substance that after 1-4 hours from ingestion causes: gastrointestinal disturbances (nausea, vomiting, diarrhea, epigastric pain), sweating with hypersecretion of fluids from the nose, mouth and bronchial, dehydration, tremors, chills, constriction of the pupil and slowing the heart rhythm (bradycardia and miosis), hypotension.

• *Glutamatergic syndrome*: the poisoning resulting from ingestion of Amanita muscaria and Amanita pantherina is characterized by a clinical

latency from 15-30 minutes to 4 hours. It presents with neuropsychiatric disorders (euphoria, exhilaration, anger, confusion), dilation and constriction of the pupil with alternating phases, incoordination of voluntary movement, excitement, or central nervous system depression, possible convulsions.

• *Psychodislettica syndrome*: due to mushrooms of the genus Psylocybe and Conocybe. The symptoms occur almost immediately and are of short duration: disorientation, aggression, distortion, mydriasis. Possible complications include convulsions and coma.

• *Gastrointestinal syndrome*: normally with benign course, the rapid onset of symptoms (1-6 hours) allows immediate treatment. Symptoms consist of abdominal and gastric pain, nausea, vomiting, diarrhea. There are various types of mushrooms that can cause this syndrome: Entoloma lividum, Tricologa pardinum, Hypholoma fasciculare, Boletus satanas, xantoderma Agaricus and Russula emetica.

• *Syndrome coprinica*: it's due to ingestion of Coprinus atramentarius in conjunction with the intake of alcohol. The following symptoms appear immediately: redness of the face and skin, frequent pulse, prostration, buzzing in ears, hypotension, dizziness. The symptoms may last only a few minutes but the consumption of alcoholic beverages have to be suspended for at least five days after ingestion.

• *Hemolytic syndrome*: A certain number of mushrooms are toxic at raw state and become good after a suitable edible cooking. The responsible of the toxicity in this genus of mushrooms are the hemolysins, toxic compounds of proteinic nature, thermolabile at 60 - 65 ° C in 30 minutes, so it is enough to cook it to make these toxins harmless, the fungus can be safely consumed.

The species responsible are numerous: Armillaria mellea (Pin), Amanita rubescens, A. vaginata, Tricholoma sp. Russula sp., Macrolepiota procera, Clitocybe nebularis, Boletus luridus, Morchella and Helvella. The cooking is always recommended for inactivation of bacteria, microbes, larvae, etc. After the onset of gastrointestinal symptoms may appear hemolytic anemia with hemoglobinuria, which may progress to acute renal failure.

Long-term incubation syndrome

The long-term incubation syndrome are characterized by symptoms that arise after 6 hours from the mushrooms ingestion, with toxicity upon the liver, kidney and the major lethal percentage that is achieved by phalloidinic syndrome, more than 20%.

The long-term incubation syndromes can be classified into various groups, based on the responsible type of mushroom:

• *Phalloidinis syndrome*: the poisoning is resulting to the ingestion of one mushroom of the lethal triad: Amanita phalloides, Amanita verna, Amanita virosa. The first symptoms arise after 6-48 hours from the ingestion. In a early time appear gastrointenstinal disorders (sickness, vomiting, coleriform diarrhea),dehydratetion by extensive sweating, sustained thirst, abdominal pains. In a second time it shows an apparent improvement that after precipitate in a clinical picture characterized by acute epatic failure, jaundice, coagulopathy , sometimes so serious dehydratetion with functional kidney failure, drowsiness, deep coma and possibly exitus. In any case, due to an acute epatic failure the liver will be irreversibly compromised, until to need a transplant. Death is more probable as major is the mushrooms ingest dose and younger is the poisoned patient.

• *Orellanic syndrome*: the orellanic syndrome is provoked by the ingestion of cortinarius orellanus. Initially it is determinated by gastrointestinal symptoms (nausea, vomit, diarrhea, epigastric pain), dehydration with consequent hypotension ,intense thirst, abdominal pains, followed by a silent phase from 3-4 to 20 days. The final result is the acute renal insufficiency accompanied by lumbar pains, thirst, muscle cramps, tremor, nausea, bilious vomit, iperazotemia, uremia, coma and possible death. However, in consequence of the acute renal insufficiency, it is necessary the hemodialysis (that often must be permanent) or kidney transplantation.

• *Proxim syndrome*: it is provoked by the ingestion of amanita proxima .The first symptoms (vomit and diarrhea) appear after 12 hours from the meal. The following step is the acute renal insufficiency and an important liver involvement is testified by the increase of the transaminasis.

• *Gyromitrin syndrome*: the ingestion of mushrooms of the kind gyromitra in two meals not outdistanced or the intake by children or people under not perfect phisics condition can cause poisonings. Besides the poisoning is very more serious as more the quantity of product is ingested in relationship to the weight of the person. The poisoning appear with vomit and sometimes diarrhea with epatic and renal

lesions. Hemolysis, neuropsychiatric disorders (restlessness, nervousness,delirium), visual disorders, cardiac arrest and death may be present.

• *Rabdomyoliysic syndrome*: Tricholoma equestre and tricholoma auratum are nushrooms responsible of such syndrome. The symptoms begin 24-72 hours after the ingestion , with fatigue, tiredness, muscle weakness and proximal muscle pain and they are accentuate in the following 4 days when it can appear facial eritema, nausea without vomit, perspiration and hyperchromic urines. The examination always show a marked increase of the serum CK (20.000-35.000 U/L) and the presence of myoglobinuria. The clinical picture can evolve toward the acute renal insufficiency or it can clear up after 2 weeks. Death may follow the lesion and destruction of muscle fibers of the diaphragm and miocardio. The hospital intervention resolve the poisoning.

• *Erythromelalgic syndrome*: it is the poisoning provoked by Clitocybe acromelalga e Clitocybe amoenolens mushrooms. The clinical picture, that appears to distance of 1-3 days from the ingestion, is characterized by algoparesthesia of the extremities especially of the feet, that can be accompanied by eritema, edema and formation of vescicles. The symptoms, that can persist for many days or some months, are characterized by paroxysmal crisis, mainly nighttime, stimulated by the contact and by the heat.

• *Neurotoxic delayed syndrome*: it is caused by the Hapalopilus rutilans mushroom.The clincal picture appears 24 hours after the ingestion and it is characterized by drowsiness, decrease of visual acuity, weakness and reduction of the muscular tone, signs of epatic and renal involvement.

Therapeutic approch

Today there are not specific antidotes, except for the poisoning by mushrooms containg muscarine. In this case, however easily to diagnose in relation to symptomatological findings, atropine can be used and it should be administered as atropine sulfate at a dose of 0,5-1 mg every 4 hours i.m or e.v. until resolution of symptoms. The attitude of the doctor should always be marked by a moderate aggressivity; furthermore should always follow the total restoration to the monitoring of water losses. For every case of mushroom poisoning should be attempt to stabilize the vital functions (measures of Basic Life Support), to reduce the absorption of the toxic substance, to eliminate the toxic substance already absorbed. The therapeutic scheme in suspected mushroom poisoning includes:

1) *In both cases,* both in short incubation time (less than 6 hours) and in poisoning long incubation (more than 6 hours), gastrolusi needs to be done in order to perform a gastric decontamination, as therapeutic also on the vomiting.

2) *Microbiological examination* of the wastewater from the washing.

3) *To administer activated charcoal* through nasogastric tube (1g/Kg):

a) In 2-3 divided doses in the case of short incubation syndrome

b) In repeated doses in the case of long incubation syndrome.

4) *The treatment* goes on with:

a) Hydration for the short incubation syndrome

b) Dosage of urinary amanitin (within 48 hours) to establish or exclude the diagnosis of falloidea syndrome.

5) *To administer a cathartic* (magnesium solphate) if the patient does not present diarrhea:

a) *The treatment for short incubation* poisoning is restricted to symptomatic therapy;

b) *The treatment for poisoning* that could have a lethal effects also includes: silibinina initial intravenous bolus of 5 mg/kg, followed by continuous infusion of 20 mg/kg/day during the first 3 days after ingestion, that should stop the hepatocyte receptors for aminitina in the specific case of the falloidea syndrome, following which may occur cases of fulminant hepatitis for which it may be necessary liver transplantation; forced diuresis by hydration with 1L/10 kg body weight plus the losses (in a man of 70 Kg it is considered necessary the infusion of 11-12 liters of isotonic saline solution) to achieve a balanced output of 3-6 mlt/kg/h; dialysis support during acute renal failure and possible kidney transplant; high-dosed corticosteroids.

Conclusion

The classification of the early and late syndrome is necessary to drive the physician in the diagnosis and to begin the most suitable treatment. The symptoms in the long latency forms can initially simulate a gastroenterite due to the fev, so that the patient and the same doctor underestimate the risk and he lately resorts to the hospitalization and to the care, jeoprazing sometines in irreparable way

the state of health. At the end of the meal, or however within a couple of hour , the patient feels violent abdominals pains with phenomena of vomit and diarrhea, that are extended for a long time and that can bing in the most serius case to the complete debilitation of the patient, for the loss of liquids; in these cases is important the hospitalization for the water and electrolyte replenishment. Same potentially lethal syndromes that determine the appearance of the clinical picture after a latency of six hours, can occasionally give a precocious debut, following the difference of reaction of every single organism. Therefore it is necessary an aggressive treatment up to the exclusion of amatoxic syndrome, the most lethal of these syndromes, trough the dosing of urinary amanita.

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