

Utilidad de la tomografía en la intoxicación por paraquat: reporte de caso

Usefulness of tomography in paraquat poisoning: a case report

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Abstract

Paraquat is a pesticide from the group of herbicides associated with high morbidity and mortality after ingestion with suicidal intent. Within the prognostic aids, in the patient intoxicated by this substance, the international literature considers the chest tomography and its findings. However, in Colombia, there are no reports at the national level, nor is there any inclusion of this parameter within the guidelines of the Ministry of Health. We report the case of a patient with a late diagnosis of paraquat poisoning, admission tomography did not indicate pulmonary compromise, so treatment was started and favorable results related to the patient's survival were obtained.

Key words: Paraquat, poisoning, tomography.

Resumen

El paraquat es un plaguicida del grupo de los herbicidas asociado a una gran morbimortalidad, luego de su ingesta con intención suicida. Dentro de las ayudas pronósticas, en el paciente intoxicado por esta sustancia, la literatura internacional considera la tomografía de tórax y sus hallazgos, sin embargo, en Colombia, no hay reportes a nivel nacional, ni inclusión de este parámetro dentro de las guías del Ministerio de Salud. Reportamos el caso de una paciente con diagnóstico tardío de intoxicación por paraquat, la tomografía de ingreso no indicó compromiso pulmonar así que se inició tratamiento y se obtuvo resultados favorables relacionados con la supervivencia de la paciente.

Palabras clave: Paraquat, intoxicación, tomografía.

Introduction

In Colombia, the incidence of poisoning, according to the Public Health Surveillance System (SIVIGILA by its acronym in Spanish), has an incidence of 45 per 100,000 inhabitants. For the year 2019, 22699 cases were reported. In our environment, poisoning with suicidal intent is more frequent than accidental poisoning, includes the use of pesticides, rodenticides, herbicides, commonly used drugs (analgesics) and psychiatric drugs (1,2) and mainly affects women.

Paraquat is an herbicide of the bipyridyl family that is associated with high morbidity and mortality. Paraquat poisoning is a major health problem worldwide and has even been banned in different places, but because of its effectiveness and low cost it continues to be used in countries like ours, being associated not only with mortality but also with morbidity and respiratory after-effects (3).

The management recommended in the Colombian Ministry of Health and Protection guidelines is to initiate early decontamination measures and administer drugs such as N-acetylcysteine, propranolol, vitamin E, cyclophosphamide, and prednisolone, in order to reduce inflammation and lung damage secondary to lipid peroxidation, thus avoiding pulmonary fibrosis. The guidelines of the Ministry suggest a group of paraclinical tests that should be performed since the physiopathology of paraquat poisoning involves many organs and systems such as kidney, liver, electrolytes, among others. Regarding pulmonary diagnostic aids, the most frequently described have been chest X-rays and spirometry (4).

Chest tomography is not a diagnostic aid proposed in the guidelines or routinely used in this disease, although it is true that there are reports since 1995 of patients poisoned by paraquat who underwent tomography, and in recent years it has been used more frequently (5).

We report the case of a 40-year-old woman with suicidal intoxication by paraquat in whom the initial management was not performed. Four days after ingestion, treatment with triconjugate was started, a tomography was performed and due to the lack of findings of pulmonary involvement, management was continued with a successful outcome, which is rare in the literature.

Our objective is to increase awareness among health care professionals of the usefulness of chest tomography as a diagnostic aid, which, although it should not delay initial management, can be considered in the decision-making process in patients with paraquat poisoning.

Ethical considerations:

The research committee of the Hospital General de Medellín Luz Castro Gutiérrez was asked to approve the review of the clinical history.

Clinical case

The patient reported the ingestion of the pesticide Gramoxone from admission, the evolution and the clinical and paraclinical findings were congruent with this information and therefore were not considered differential.

45-year-old female patient admitted four days after having ingested an unknown amount of Gramoxone (Paraquat) with hematemesis, odynophagia, and dysphagia to liquids, admitted with blood pressure 157/92 mmHg, heart rate of 102 beats per minute, respiratory rate of 17 and ambient oxygen saturation of 92%, on physical examination she was sialorrhagic, with oral aphthous ulcers of scarce active bleeding, erythematous pharynx, pain on cervical palpation, without other pathological findings. She was kept in the emergency room on a stretcher with continuous hemodynamic monitoring, paraclinical tests were performed (see Table 1), infectious pathology was ruled out with HIV, VDRL and surface antigen for hepatitis B were not reactive and treatment was started with N-Acetyl-Cysteine at 100mg/kg/hour, propranolol 40mg/6h and vitamin E 400UI/12h.

Table 1. Paraclinics

Paraclinical	Date								
	Feb-13	Feb-14	Feb-16	Feb-20	Feb-21	Feb-22	Feb-25	Feb-28	Mar-03
Hemoglobin	17.04	15	13.6		13.1		11.8		
Leukocytes	33541	21800	9500		12200		12200		
Neutrophils	26200	17000					7320		
pH	NC	7.39	7.47	7.46	7.46	7.55	7.5	7.51	7.48
BE	NC	-2		5.9		7.3	7.1	6.2	4.5
PCO2	37.4	37.6	39.6	41.8	39	34.3	40	37	38.1
PO2	580	69	54.4	65.4	62.7	69.2	59.5	78.9	76.3
HCO3	NC	23.3	27.9	29.6	27.7	30.6	30	29	28
Lactate	0.63	0.59							
Creatinine		3.7	1.8	0.8	0.8	1		0.9	0.7
BUN		78	59	29.7	23.3	20		21.6	

NC: Not calculated

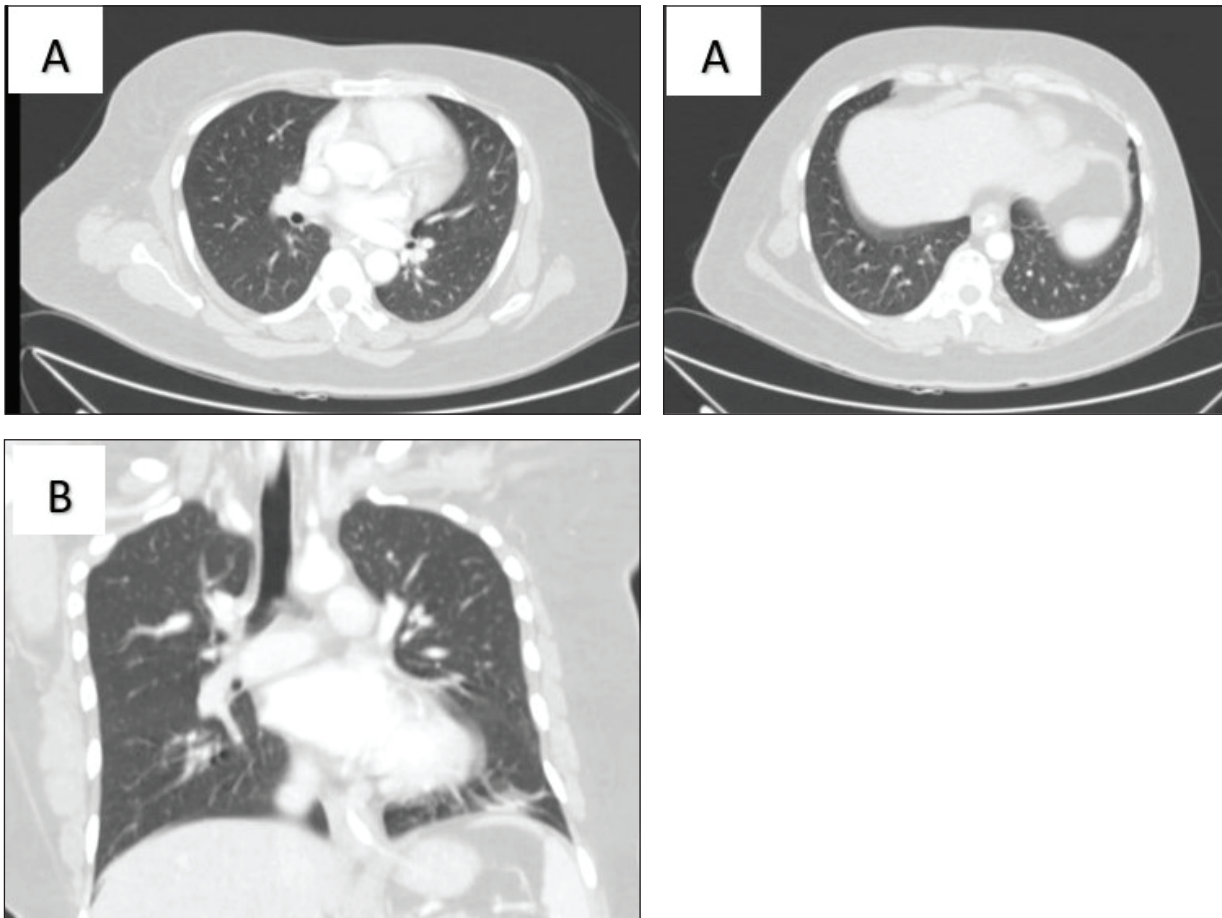
The patient was evaluated by toxicology with follow-up paraclinical tests with improvement of the parameters and report of elevated creatinine, so it is considered a poor initial prognosis due to late diagnosis and initiation of treatment, in addition to evident deterioration of renal function, although at that time without hypoxemia, Chest tomographic image was performed (See image A and B) without finding evidence of pulmonary involvement, so it was decided to continue treatment and additional methylprednisolone and cyclophosphamide at 15mg/kg for two days, opioid analgesia was also adjusted and the rest of the treatment was continued. The possibility of hemoperfusion or hemodialysis was discussed with nephrology, however, it was considered by this specialty that given the evident renal compromise, there is no longer benefit from any extracorporeal treatment, follow-up and monitoring was also initiated by psychiatry, who indicated treatment with benzodiazepines.

During the following days, the patient showed improvement of renal function, after management with intravenous fluids, which suggested some associated pre-renal component. Her care was arranged in an intensive care unit and the initial treatment was continued, vital signs remained stable, with oxygen saturation at the lower limit, which was allowed with the objective of not administering supplemental oxygen, knowing the deleterious effect of the same in this patient. She was evaluated for nutrition due to the impossibility of ingestion due to dysphagia, with endoscopic finding of esophageal burn and partial compromise of the airway, so a jejunal tube was placed for feeding.

An esophagogram was performed without evidence of lesions, expectant management was maintained regarding respiratory parameters and the same management was continued until there was evidence of improvement in PO₂. In addition, she was evaluated by pneumology who indicated outpatient follow-up with spirometry due to being an asymptomatic patient with no respiratory symptoms.

On the 18th day of hospitalization and 23rd post-event, she was discharged, asymptomatic, with tolerance to the oral route, and an order was given for outpatient evaluation by pneumology, toxicology and internal medicine. After discharge, the patient was not followed up again.

« *The patient was evaluated by toxicology with follow-up paraclinical tests with improvement of the parameters and report of elevated creatinine.* »



Images A and B
Axial and coronal slices of contrasted chest tomography in lung window without areas of lung space consolidation or ground glass.

Discussion

Paraquat is one of the pesticides within the group of bipyridyls, being currently considered one of the most toxic pesticides in existence, since fatal cases have been described, even with ingestion of low volumes of the substance, reporting a mortality rate between 50 to 90% in accidental cases and close to 100% in intentional-suicidal ingestion (6).

Upon entry into the human body, paraquat is described as a corrosive substance that on contact causes damage to the gastrointestinal tract and after absorption generates intracellular toxicity by the generation of reactive oxygen species that lead to cell necrosis, with greater involvement at the pulmonary and renal level, organic failures that lead to death in patients in the context of poisoning by this substance (7).

For almost 30 years there have been reports of paraquat poisoned patients who have undergone thoracic imaging as part of the prognostic approach. It has been found that chest radiography in these patients shows a low sensi-

vity to detect the lesions produced but it is useful in making therapeutic decisions in these patients because when a pattern of normality is found, the survival of the patients increases (8,9,10).

The initial findings correspond to alveolar involvement with areas of ground glass, according to some reports with greater involvement in the subpleural region, which progress to areas of consolidation associated with bronchiectasis and parenchymal bands until reaching fibrosis with cystic areas and panalization in survivors, changes that at some point were considered progressive and irreversible, however, for some years there have been reports of long-term follow-up of these patients where there is a decrease and even disappearance of fibrosis after a few years (8,10,11).

The presence of manifestations of pulmonary involvement or imaging evidence of alterations due to the presence of pneumomediastinum, pneumothorax and pneumopericardium have been described for a long time, although defined as rare due to their low frequency, they are related as predictors of increased mortality in these patients (12,13,14).

In other countries, nomograms have even been established that can be added to other factors to be used within the algorithm of care in these patients and to establish a prognosis or to clarify a differential diagnosis in case of doubt, such as in those where there is no clear history of contact with the toxicant. In the current guidelines of our country, for the care of toxicological emergencies, no imaging diagnostic aid is taken into account, so the presentation of this case where despite the late diagnosis and treatment of a patient, with chest X-ray image without evidence of alteration of the lung parenchyma, served to define continuity of the usual treatment described for these patients, therefore, it becomes a relationship in line with the world literature of the best prognosis that these patients may have (15, 16).

For now, there are no reports of other cases in the country with similar evolutions and with tomographic findings reported as normal. However, this report offers the Colombian medical community the imaging assistance in those patients where, despite having a substance intoxication with such a high

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mortality rate, and even with a late diagnosis and treatment initiation, it is useful for therapeutic decision making, including the continuity of treatment.

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