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Factors associated with the development resistant to treatment: a case report

Factores asociados al desarrollo de resistencia al tratamiento: reporte de un caso

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Palabras claves:
Tuberculosis, resistencia a tratamiento, adherencia, factores de riesgo, DM tipo 2.

Resumen

Introducción. La tuberculosis multirresistente es una amenaza para la salud pública, a pesar de existir tratamiento, sigue siendo la enfermedad infecciosa que más muertes produce a nivel mundial. Objetivo. Determinar factores asociados de tuberculosis multidrogoresistente mediante un caso clínico del Centro de salud El Paraíso de la ciudad de Machala. Metodología. Se trata de un paciente masculino de 43 años, raza mestiza, ocupación ninguna, con antecedentes de diabetes mellitus tipo II, desde hace 17 años, en tratamiento actual regular con insulina de acción intermedia 20 UI AM y 10 UIPM , con mal control y no adherido al tratamiento, consumo de alcohol 4 veces por semana, tabaco 2 cajetillas diarias, consumo de cocaína hace 5 años por 6 meses, acude por presentar un cuadro clínico caracterizado por tos con expectoración mucopurulenta, acompañado de perdida de pesa, alza térmica nocturna, astenia y anorexia aproximadamente desde hace 1 mes. Es diagnóstico de tuberculosis resistente al tratamiento por lo que inicia esquema de segunda línea. Resultados. Paciente con tuberculosis resistente a rifampicina con factores de riesgos asociados; drogadicción, alcoholismo, fumador crónico, diabetes tipo 2 insulinodependiente más riesgo psicosocial elevado.

Keywords:
Tuberculosis, resistencia a tratamiento, adherencia, factores de riesgo, DM tipo 2.

Abstract

Introduction. Multidrug-resistant tuberculosis is a threat to public health; despite the existence of treatment, it continues to be the infectious disease that causes the most deaths worldwide. Objective. To determine factors associated with multidrug-resistant tuberculosis through a clinical case from the El Paraíso Health Center in the city of Machala. Methodology. This is a 43-year-old male patient, mestizo race, no occupation, with a history of type II diabetes mellitus for 17 years, currently under regular treatment with intermediate-acting insulin 20 IU AM and 10 IU PMI, with poor control and not adhering to treatment, alcohol consumption 4 times per week, tobacco 2 packs per day, cocaine consumption 5 years ago for 6 months, presenting a clinical picture characterized by cough with mucopurulent expectoration, accompanied by weight loss, nocturnal thermal rise, asthenia and anorexia for approximately 1 month. He was diagnosed with treatment-resistant tuberculosis and started a second-line treatment regimen. Results. Patient with rifampicin-resistant tuberculosis with associated risk

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factors: drug addiction, alcoholism, chronic smoker, insulin-dependent type 2 diabetes, and high psychosocial risk.

Introduction

Multidrug-resistant tuberculosis (MDR-TB) is a public health threat and generates a health crisis; despite the availability of treatment, it is considered one of the most important complications of the disease (1). However, the World Health Organization (WHO) reports that only 1 in 3 people with resistance to TB treatment had access to treatment in 2020 (2).

In addition to being a public health problem, tuberculosis has also become a disease with catastrophic costs that account for an additional 20% of annual household expenses for the patient and families coping with this disease. The results of 23 applied surveys revealed that the percentage of expenses was between 13% and 92% of the expenses borne by the patient (2).

In recent years, MDR-TB cases have increased, this may be due to associated risk factors such as Diabetes mellitus (DM) t2 (3), poor adherence to treatment of Tuberculosis (TB), poor patient attitude towards the disease, interruption of treatment according to the scheme, susceptibility to the disease; co-infection between the disease caused by the human immunodeficiency virus (HIV) is the most important risk factor (4).

According to the National Directorate of Prevention and Control Strategies, the cases of tuberculosis resistant to Rinfampicin and MDR-TB have increased in the period from 2013 to 2018, 347 cases have been registered (5), which calls attention to know what are the risk factors associated with drug resistance in the treatment of tuberculosis, knowing these factors can make a correct assessment of those patients diagnosed with the disease and avoid future complications caused by resistance to first-line drugs for the treatment of tuberculosis.

An investigation conducted in the city of Esmeraldas with patients diagnosed with tuberculosis and their attitudes towards the disease concluded that, despite the strategies developed in primary care for the control of the disease, no changes have been achieved due to poor behavior towards the disease and inefficient healthy practices (6).

In the Micro Red Trujillo Metropolitano Peru, a study was conducted between 2009 and 2013 on the risk factors associated with MDR-TB, which concluded that the main statistically associated factors were treatment abandonment, contact with a patient with MDR-TB, history of TB and having been hospitalized in a medical unit (7).

In a retrospective cohort study conducted in Ecuador, loss to follow-up of MDR-TB patients with rifampicin-resistant MDR-TB, in the adjusted analysis and characteristics statistically associated with alcohol and drug addiction had an odds ratio (OR): 2.82 (95% CI: 1.10-7.23), p=0. 03 and having a diagnosis of MDR-TB by the Xpert MTB/Rif® test, (OR): 1.53 (95% CI 1.00-2.35), p=0.05, which allows analyzing that in Ecuador the loss of follow-up and non-compliance with treatment is closely related to the consumption of addictive substances alcohol and drugs (8).

Analyzing the risk factors related to drug resistance in the treatment of tuberculosis allows for improved follow-up and control of the spread of the disease; detecting individual risk factor(s) will help to improve the prognosis of the disease. The objective of this study is to determine the factors associated with drug-resistant tuberculosis through a clinical case from the El Paraíso Health Center in the city of Machala.

Description of the clinical case

This is a 43-year-old male patient, mestizo race, no occupation, with a history of type II diabetes mellitus for 17 years, currently on regular treatment with intermediate-acting insulin 20 IU AM and 10 IU PMI, with poor control and not adhering to treatment, alcohol consumption 4 times per week, tobacco 2 packs per day, cocaine consumption 5 years ago for 6 months, presenting a clinical picture characterized by cough with mucopurulent expectoration, accompanied by weight loss, nocturnal thermal rise, asthenia and anorexia for approximately 1 month.

He was admitted to the 2nd level of care hospital through the emergency service, where he was diagnosed with rifampicin-resistant pulmonary tuberculosis by means of molecular testing, started antifungal treatment, and was referred to the first level of care operating unit with the same symptoms. On physical examination, the chest showed decreased elasticity and expansibility, decreased vesicular murmur, crepitant rales in both lung bases.

He was evaluated by the national/zonal TB technical advisory committee, which indicated to start treatment with a shortened oral regimen with bedaquilline, linezolid, clofazimide, levofloxacin for 9 months.

Laboratory tests: Prior to admission to the emergency department, he was tested for COVID-19 quantitative antibodies: IGM: 0.41 Au/mL, IGG: 0. 17 Au/Ml, smear 06/07/2021: smear: (+++), tests, Xpert MTB/RIF: detected level A, rifampicin resistant, 07/07/2021: Anti-HIV 3rd: Non-reactive, Anti-HIV 4th: Non-reactive, 17/7/2021: Audiometry: Hearing sensitivity within normal limits bilateral hearing, 09/13/2021: Electrocardiogram: normal, 08/13/2021:Hemoglobinaglycosylated: 8. 90%, basal glucose: 153mg/dl; 11/17/2021: Urea: 30.50mg/dl, creatinine: 0.84 mg/dl, TGO:

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38.91U/L TGP:92.42 U/L Sodium: 127.00 mEq/L, Potassium: 4. 20 mEq/L, Chlorine: 99 mEq/L, 11/30/2021: Blood Biometry: Leukocytes: 9.80, Neutrophils: 68.15%, Lymphocytes: 23%; Platelets 538, Hemoglobin: 11.11g/dL, Hematocrit: 32.22%.

The patient's evolution has been favorable up to the present. After 3 months of regular treatment, he has not presented any complications, negative monthly smear tests, weight gain of 4 kilos since the beginning of medication.

Discussion

Drug-resistant strains of tubercle bacillus are obviously more difficult to treat than drug-sensitive strains, which is why it is considered a major problem for public health and delays global progress towards meeting the objectives of the End TB Strategy (8).

The treatment of sensitive resistant tuberculosis has two bases: the group of drugs that avoid resistance and lengthen the treatment time to ensure recovery and cure, thus avoiding relapses. There are two types of drugs, the essential ones used in the treatment of TB are those with good bactericidal activity that multiply inside the cavities responsible for the symptoms and transmission, have a good sterilizing capacity, i.e. have the function of destroying bacilli in the semi-latent phase, which are responsible for relapses. The accompanying drugs have the function of preserving the essential drugs and preventing resistance.

Table 1.

Risk factors associated with MDR tuberculosis

High risk factors	Moderate risk factors
Patients previously treated for TB, especially failures to previous treatment regimens, but also relapses and recovered dropouts.	Patients with copy positive bacilli at the end of the second month with initial treatment (HRZE) and in whom initial drug sensitivity is unknown.
Cohabitant or intimate contact of a patient who has MDR-TB.	Patients from countries with high rates of initial MDR-TB.
	Patients living in closed institutions, such as prisons or shelters where MDR-TB cases have occurred.
	Healthcare personnel, especially those caring for MDR-TB cases.
	Patients with comorbidities that may lead to malabsorption.
	HIV infection.

Elaboration: modified by the authors the diagnosis and treatment of drug-resistant tuberculosis (9).

In Peru, a clinical case analysis of a 20-year-old female MDR-TB patient with MDR-TB reported that the main factor associated with drug resistance was contact with a TB patient, poor adherence to treatment, and social risk. In addition, the family environment is essential for treatment adherence.

In a multicenter file review with 657 records conducted in 2020, the authors described that the group of diabetic individuals with hba1c <7% had a lower risk of developing rifampicin resistance, isoniazid resistance and MDR, with odd ratios (OR) of 1.90 (p = 0.001), 2.896 (p <0.001) and 3.228 (p <0.001), respectively, thus concluding that glycosylated hemoglobin is a predictive factor for tuberculosis complications (10).

A retrospective cohort study conducted in China on the survival of patients with MDR-TB concluded that patients diagnosed with MDR-TB plus associated pathologies increase the risk of death, so it is essential to make decisions in the health system to prevent mortality from this disease (11).

A case-control study involving 124 respondents, of which 31 were cases and 93 controls, identified six statistically significant independent risk factors for MDR-TB progression, these were monthly family income OR: 3.71; treatment abandonment OR: 3.33, stigma associated with TB. OR: 2.97, subjective feeling of sadness OR = 4.05 and chronic obstructive pulmonary disease (OR=4.51; 95% CI=1.07 to 18.96 (12-15).

Conclusion

Treatment-resistant tuberculosis is caused by several risk factors, so treatment and follow-up must be managed in a comprehensive manner, and prevention of this disease remains essential to reduce drug resistance.

The risk factors associated with drug-resistant tuberculosis are related to non-compliance with treatment, concomitant diseases, direct contact with carriers of resistant strains, patient with HIV, and alcohol and drug use.

Early diagnosis and prompt initiation of treatment prevents complications and cures the patient in a timely and appropriate manner.

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Conflict of Interest

The authors declare no conflict of interest.

Authors' contribution statement

The first author contributed with the project idea, writing, methodology, the second author with part of the methodology, article analysis and writing, and the last author contributed with the journal search, writing and adaptations of the study.

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