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Research Article

Outcome of the Short 9-Month Treatment Regimen in Multidrug-Resistant Tuberculosis. Case of Burundi

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Abstract

Objective: To determine the outcome of the short 9-month treatment regimen in multidrug-resistant tuberculosis (MDR-TB) patients.

Patients and Methods: This is a retrospective study on the outcome of the short 9-month treatment regimen for multidrug-resistant tuberculosis patients in Burundi conducted from May 2013 to January 2017. The study population consisted of patients followed up and treated for MDR-TB at the NCPC in Kibumbu during the study period.

Results: During the study period, 180 multidrug-resistant TB patients were enrolled. 66.11% of our patients were male and 38.89% were female. The most represented age group was ≤ 45 years. 21.11% of our patients were HIV positive and this variable was statistically significant in relation to the occurrence of death (p = 0.0360). 74.44% of our patients developed side effects with the occurrence of grade 4 to 6.8% (5/73) represented by auditory, hepatic, digestive disorders respectively 2 cases, 2 cases and 1 case. Therapeutic success was obtained in 93.88% of cases.

Conclusion: The short standardised regimen of 9 months is effective in controlling the emergence of MDR-TB. Its tolerability remains somehow controversial given the toxicity of 2nd line drugs.

Keywords: *Multidrug-Resistant Tuberculosis (MDR-TB); Tuberculosis (TB); Burundi*

Introduction

Tuberculosis (TB) is a major cause of morbidity and mortality worldwide. The World Health Organization (WHO) estimates that there will be 10 million new cases in 2019, mainly in developing countries [1]. Although a reduction in TB cases and deaths has been observed over the last twenty years, multidrug-resistant TB (MDR-TB), defined as resistance to both isoniazid and rifampicin, remains a real challenge with 558,000 new cases of MDR-TB estimated in 2017 according to the WHO. Burundi, like other countries, is facing the emergence of forms of resistance to the major first-line molecules Rifampicin and Isoniazid. Data collected by the NIPT show that, from 2001 to 2018,

540 cases of multidrug-resistant tuberculosis (MDR-TB) were recorded and received the necessary treatment and follow-up. [2] In addition, since June 2016, the WHO recommends the use of the short (9-month) MDR-TB treatment regimen [3]. The regimen must include at least 4 never-before-administered second-line drugs with proven or highly probable efficacy, among which one injectable and more or less pyrazinamide, a latest-generation fluoroquinolone must be included [4].

Aim of the Study

Our study aimed to investigate the outcome of this short 9-month regimen in multidrug-resistant TB patients.

Patients and Methods

This is a retrospective study on the outcome of the short 9-month regimen for the treatment of multidrug-resistant tuberculosis in Burundi conducted over a period from May 2013 to January 2017. The study population consisted of patients followed up and treated for MDR-TB at the NCPC in Kibumbu during the study period. Information was collected on socio-demographic variables, side effects and treatment outcome. It was entered and analysed using Microsoft and epi-info 7 software.

Results

During the study period, 180 multidrug-resistant tuberculosis patients were collected. 66.11% of our patients were male and 38.89% were female. The most represented age group was ≤ 45 years. 21.11% of our patients were HIV positive and this variable was statistically significant in relation to the occurrence of death (p = 0.0360). 74.44% of our patients developed side effects with the occurrence of grade 4 to 6.8% (5/73) represented by auditory, hepatic, digestive disorders respectively 2 cases, 2 cases and 1 case. Therapeutic success was obtained in 93.88% of cases.

Age group	Effective	Percentage
0 - 30 years	80	44,44
31 - 45 years	62	34,44
More than 45 years	38	17,77
Total	180	100

Table 1: *Distribution of patients by age.*

Type of disorder	Total		Grade 1		Grade 2		Grade 3		Grade 4	
	N	% (n = 73)	N	%	N	%	N	%	N	%
Hepatic	61	83,56	40	54,79	18	24,65	1	1,36	2	2,73
Digestive	5	6,84	3	4,10	1	1,36	1	1,36	1	1,36
Osteoarticular	1	1,36	1	1,36	0	0	0	0	0	0
Neurological	1	1,36	1	1,36	0	0	0	0	0	0
Audory	4	5,47	1	1,36	0	0	1	1,36	2	2,73
Respiratory	1	1,36	0	0	0	0	1	1,36	0	0

Table 2: *Distribution of patients with disorders according to their grade.*

Assessment	Effective	Percentage
Healed	157	87,22
Treatment completed	12	6,66
Death	8	4,44
Lost to view	2	1,11
Failure	1	0,56

Table 3: *Detailed distribution of patients by treatment outcome.*

Discussion

In our series, 78.88% of the patients were between 0 and 45 years old. The mean age was 34.95 years with extremes of 6 and 78. They are in the age group most affected by tuberculosis in general but also MDR-TB in particular with a male predominance. At the global level, TB affects mostly young subjects with a male predominance. According to WHO (2013, 10), in 2012, 82% of TB cases were between 15 and 64 years of age. The male population dominated these cases with a male/female sex ratio of 1.7 [5]. This male predominance could be explained by the fact that males are more exposed to certain risk factors for TB such as tobacco and alcohol. HIV infection is one of the factors favoring the transition from TB infection to TB disease [6]. In our study, 38 out of 180 of our population (21.11%) had a positive HIV serology.

According to the UNION study, 19.9% of their population had a positive HIV serology [7]. Phuong., *et al.* in their study conducted in Viet Nam, found that only 4% of their population was HIV positive [8]. In Burundi, Murhula, Ciza and Niyonsaba found that 37.9%, 25% and 30.57% of the cases in their series were HIV positive respectively [9-11]. In our series, side effects occurred in 74.44% of cases. The gradation of side effects was performed in 54.47% for our series. The disorders (hepatic, digestive, neurological, auditory, osteo-articular, respiratory) were rated Grade 1 in 63% (46/73) and 26% Grade 2. Grade 4 was observed in 6.8% (5/73) especially auditory, hepatic, digestive disorders respectively 2cas, 2 cases and 1 case Change of diet was observed in only one patient. In Iran, with the 24 months regimen consisting of ofloxacin, cycloserine, prothionamide, amikacin, ethambutol and pyrazinamide, Masjedi., *et al.* found that among 43 cases, 25 (58.1%) had clinically significant treatment-induced adverse events, the most common of which was hearing loss (20: 46%), followed by liver disorders (4:9.2%), psychosis/suicide attempts (3:6.9%; 2 of which died) and tinnitus (1:2.3%) [12]. Of these patients who experienced adverse events, 20 patients (46.5%) required treatment modification. In Bangladesh, on a 9 month regimen: 4KmGfxPtoCfzEZ/5GfxCfzEZ, Aung., *et al.* found that vomiting was the most common adverse event reported (n ¼ 111 patients, 21.6%) [13].

In our series, the cure rate was obtained in 87.2% of cases with a treatment success rate of 93.88%. There were two cases of loss of sight (1.11%), one case of failure (0.56%) and 8 cases of death (4.44%). HIV seropositivity was the only statistically significant factor in mortality ($p = 0.0369$). Our results are superior to those of other authors who have worked on other regimes: In Viet Nam, success was obtained in 73% of cases with 13% lost to follow-up, 8% death, 6% failure. Patients with positive HIV serology had a high risk of having an unfavorable outcome at the end of treatment ($p < 0.01$) [8].

For Van Deun., *et al.* (2004, 563) in Bangladesh, on a 21-month regimen, death occurred in 14% of cases, failure in 5% of cases, dropout in 12% of cases and cure in 69% of cases [14]. However, our results are close to those of authors who have worked on a regime similar to ours: In Bangladesh, on a 9-month GFX-based regimen, 84.5% of cases was a treatment success, 5.6% death, 7.7% dropout [13]. The absence of resistance to fluroquinolones and the use of a short regimen would be responsible for the remarkable success of our series.

Conclusion

The short standardized 9-month regimen is effective in controlling the emergence of MDR-TB. Its tolerability remains somewhat controversial given the toxicity of 2nd line drugs. Strengthening health education and the fight against the HIV/AIDS pandemic will certainly reduce the occurrence of MDR-TB-related deaths.

Bibliography

1. Global tuberculosis repport, WHO-Geneva (2019).
2. Ministère de la Santé Publique et de la Lutte contre le Sida, Programme National Intégré de Lutte contre la Tuberculose: Directives nationales pour la prise en charge de la tuberculose pharmacorésistante au Burundi (2019).
3. Global tuberculosis repport, WHO (2018).
4. PNILT. "Directives Nationales pour la Prise en Charge de la Tuberculose Pharmacorésistante. Bujumbura: PNILT (2016).
5. World Health Organization (WHO). Global Tuberculosis Report. Geneva: WHO (2013).
6. PNILT. Directives Nationales pour la Prise en Charge de la Tuberculose et Comorbidités. Bujumbura: PNILT (2015).
7. UNION. Protocole d'Etude pour L'Evaluation de la Tolérance et de l''Efficacité d'un Traitement de 9 Mois pour les Patients atteints de Tuberculose Multirésistante. Paris: Elsevier (2012).
8. Phuong NTM., *et al.* "Management and treatment outcomes of patients enrolled in MDR-TB treatment in Viet Nam". PHA 6.1 (2016): 25-31.
9. Murhula Aimé B. "Tuberculose Multirésistante: de l'Epoque de la Tuberculose Pharmacosensible à la Tuberculose Multirésistante: Cas des 29 Patients admis à Kibumbu de décembre 2013 à juin 2014. Bujumbura: Université du Burundi (2014).
10. Ciza F. "Résistance aux Antibiotiques Antituberculeux: A propos de 960 Tuberculeux Baciliferes. Bujumbura: Université du Burundi (2004).
11. Niyonsaba A. "Profil de la Tuberculose Pulmonaire à Germes Multirésistante: Une Etude Retrospective sur 5 Ans chez 121 Cas d'Exsanatorium de Kibumbu. Ngozi: Université de Ngozi (2012).
12. Masjedi MR., *et al*. "Outcome of treatment of MDR-TB patients with standardized regimens, Iran, 2002-2006". *The International Journal of Tuberculosis and Lung Disease* 12.7 (2008): 750-755.
13. Aung KJM., *et al*. "Successful 9 month Bangladesh regimen for multidrug-resistant tuberculosis among over 500 consecutive patients". *The International Journal of Tuberculosis and Lung Disease* 18.10 (2014): 1180-1187.
14. Van Deun A., *et al*. "Result of standardized regimen for multidrug-resistant tuberculosis in Bangladesh". *The International Journal of Tuberculosis and Lung Disease* 8.5 (2003): 560-567.

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