Impact of injection drug use on tuberculosis outcomes in people with HIV: a nationwide cohort study

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BACKGROUND

Tuberculosis (TB) significantly impacts morbidity and mortality among people with HIV (PWH), particularly people with injection drug use (IDU). Factors like poor treatment adherence and social instability play a significant role. In European countries with low TB incidence, understanding the differential treatment outcomes in PWH with IDU is crucial for tailored interventions. We aimed to investigate the impact of IDU on TB treatment completion and mortality rates (MR) among PWH in Denmark.

MATERIALS AND METHODS

In this nationwide, population-based cohort study, we included PWH aged ≥18 years from the Danish HIV Cohort (1995–2017) who developed TB during the study period. Medical records were reviewed by physicians. We compared clinical and TB characteristics and treatment outcomes between PWH with and without IDU (**Table 1**).
We used Poisson regression to estimate all-cause and TB-related MR and mortality rate ratio (MRR). Social burden was defined as homelessness, stay in shelter or prison facilities, and/or prostitution.

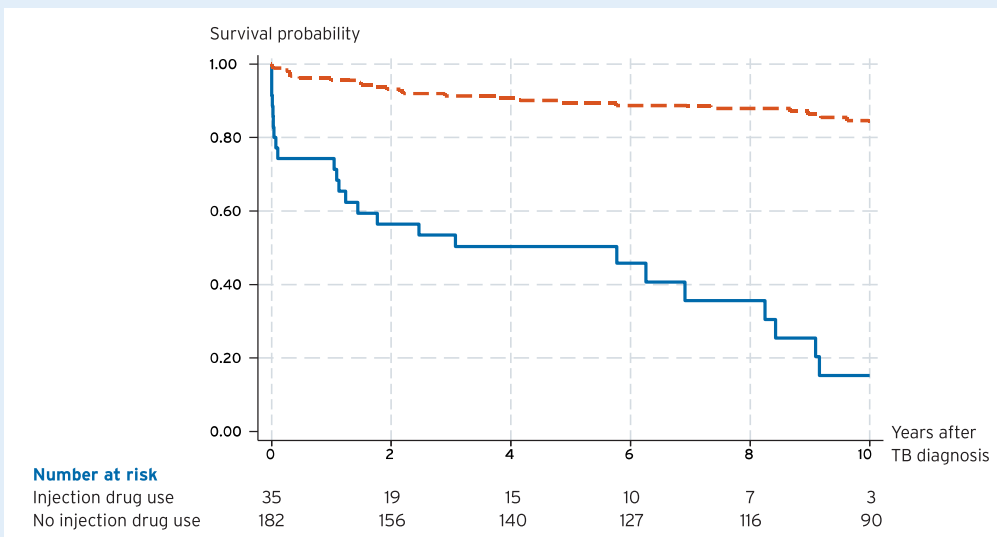
RESULTS

Two hundred and seventeen PWH developed TB during the study period, and 35 (16.1%) had a history of IDU. No significant differences were found in CD4+T counts or viral suppression at TB diagnosis, microbiological confirmation of TB diagnosis or delays in diagnosis by patients or doctors between both groups. However, the IDU group exhibited higher rates of social burden (77.1% vs 8.2%, p<0.001), higher Charlson comorbidity scores, and higher rates of pulmonary TB (65.7% vs 43.3%, p=0.048). Treatment completion rates were significantly lower for IDU (60.0% vs 94%, p<0.001). All-cause MR in IDU was 165.3/1000 person-years (95% CI 110.8-246.6; n=24) compared to 17.0/1000 person-years (95% CI 11.9-24.1; n=31) in non-IDU (MRR 9.75 [95% CI 5.72-16.61]) (Figure 1). TB-related MR was also higher for IDU (86.7 [95% CI 45.1-166.6] vs 5.5 [95% CI 2.6- 11.6], MRR 15.7 [95% CI 5.9-42.2]).

CONCLUSION

In Denmark, a country with low TB incidence, TB treatment completion rates among PWH were significantly lower for those with a history of IDU compared to non-IDU. TB-related MR were 15 times higher among the IDU group. These findings underscore the urgent need for improved TB management strategies, such as shortened treatment courses, integrated care programmes and enhanced social support for PWH with IDU and TB to enhance treatment outcomes and reduce mortality.

Figure 1: Survival probability after TB diagnosis



KEY MESSAGES:

- TB-related mortality rates were 15 times higher among PWH with injection drug use compared to PWH with no injection drug use
- Treatment completion rates for TB were significantly lower for PWH with a history of injection drug use compared to PWH with no history of injection drug use

Table 1: Baseline characteristics

Concomitant TB/HIV: TB diagnosed within 3 months after HIV diagnosis[a];
Subsequent TB: TB diagnosed 3 months after HIV diagnosis[b];
Social burden defined as homelessness, stay in shelter or prison facilities, and/or prostitution[c];
Outcome for TB treatment according to WHO guidelines[d].

	HIV/TB without IDU N=182	HIV/TB WITH IDU n=35	p-value
Male, n (%)	104 (57.1)	23 (65.7)	0.35
Age at TB diagnosis, median years (IQR)	37 (31-45)	42 (34-47)	0.05
Route of HIV transmission			
MSM, n (%)	30 (16.5)	-	
Heterosexual, n (%)	127 (69.8)	-	
IDU, n (%)	-	29 (24.6)	
Unknown, n (%)	25 (13.7)	-	
Caucasian, n (%)	50 (28.1)	31 (91.2)	<0.0001
Region of origin			<0.001
Denmark	43 (23.6)	27 (77.1)	
Greenland	6 (3.3)	<3	
Africa / Asia	115 (63.2)	3 (8.6)	
Other	15 (8.2)	<3	
HCV, n (%)	26 (14.3)	28 (80)	<0.0001
HBV, n (%)	14 (7.7))	5 (14.3)	0.21
HIV diagnosis before 1995, n (%)	24 (13.2)	14 (40.0)	<0.0001
Emigration during the study period, n (%)	13 (7.1)	0	0.103
Non-TB AIDS before TB diagnosis, n (%)	30 (16.5)	3 (8.6)	0.23
TIME OF TB DIAGNOSIS			
Concomitant HIV/TB diagnosis[a]	92 (50.6)	7 (20.0)	0.001
Subsequent TB diagnosis[b]	90 (49.5)	28 (80.0)	
HIV INFECTION			
CD4+T count at TB diagnosis, median cells/µl (IQR)	147 (62-370)	197 (84-440)	0.35
HIV VL < 50 c/mL at TB diagnosis	42 (23.1)	9 (25.7)	0.74
On ART at TB diagnosis, n (%)	50 (27.5)	11 (31.4)	0.63
COMORBIDITY			
Charlson comorbidity score at TB diagnosis			
0	147 (80.8)	11 (31.4)	<0.0001
1	19 (10.4)	17 (48.6)	<0.0001
2-5	15 (8.2)	6 (17.1)	0.10
≥6	<3	<3	0.19
SOCIAL BURDEN[c]	15 (8.2)	27 (77.1)	<0.0001
DELAY IN TB DIAGNOSIS			
Patient delay (days, IQR)	35 (14-73)	21 (14-30)	0.16
Doctor delay (days, IQR)	10 (3-28)	11 (3-30)	0.77
TB DIAGNOSIS BASED ON:			0.63
Microbiology (PCR or culture)	149 (82.8)	31 (88.6)	
Histopathology	29 (16.1)	4 (11.4)	
Clinical suspicion	<3	0	
RESISTANCE			
Any resistance	9 (5.0)	5 (14.3)	0.10
Multidrug resistance	<3	<3	-
TB LOCALIZATION			0.048
Pulmonary	79 (43.3)	23 (65.7)	
Extrapulmonary	43 (23.6)	4 (11.4)	
Disseminated	60 (33.0)	8 (22.9)	
TREATMENT OUTCOME[d]			<0.0001
Cure	5 (2.8)	0	
Treatment completed	166 (91.2)	21 (60.0)	
Treatment failure	0	0	
Treatment interrupted	4 (2.2)	6 (5.1)	
Relapse	13	5	

Region of Southern Denmark

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