

ABSTRACT

Background: We recently documented a higher than suspected prevalence of HIV infection among pregnant women and a high mother-to-child HIV transmission rate at the Tijuana General Hospital in Baja California, Mexico. This study evaluated HIV-related disease progression in children identified through this program.

Methods: Children diagnosed with HIV infection and followed at the Pediatric HIV clinic at Tijuana General Hospital between 1998 and 2005 were observed longitudinally for CD4 cell percentage, plasma HIV RNA log₁₀, antiretroviral treatment, morbidity and death. Median survival was calculated by the Kaplan-Meier method.

Results: A total of 61 children were followed during the study period; 53% were boys. The mean age at HIV diagnosis was 2.5 years (SD +/- 3.35), 55% were diagnosed before their 2nd birthday. Thirty eight (62%) cases were diagnosed with HIV between 2002 and 2005. Thirty-one (51%) cases were CDC classification group C at the time of HIV diagnosis and two-thirds (66%, n=40) had ≥ 1 admission to the hospital prior to HIV diagnosis. Among a total of 74 pre-HIV admissions, pneumonia was the most common morbidity (58%) at or prior to HIV diagnosis, followed by failure to thrive (23%) and gastroenteritis (18%). Mean CD4% was 20%, 24%, 23% and 27% for the years 1998-99, 2000-01, 2002-03, and 2004-05, respectively (p=0.16). HIV RNA log₁₀ did not change over time and was 4.91, 4.36, 4.24 and 4.00 for the years 1998-99, 2000-01, 2002-03 and 2004-05, respectively (p=0.14). Triple drug combination antiretroviral therapy was used in 63% of patients during 1998-2001 and increased to 81% for the period between 2002 and 2005. Overall mortality was 31% (19/61) with pneumonia as the most common cause of death (47% of all deaths) followed by PCP and tuberculosis with 16% each. When stratified by year of diagnosis, no temporal trends were observed in morbidity or CDC clinical classification at the time of HIV diagnosis. The majority of deaths (79%) occurred on or prior to 2003. Mean age at death was 3.2 years (SD +/- 4.03). Kaplan Meier survival analysis showed that the 1 year survival was median survival was 86%, 2 year survival was 80% and two-thirds (66%) survived to their 5th birthday.

Conclusions: These findings indicate a high morbidity at the time of HIV diagnosis and a declining mortality in this cohort of perinatally HIV infected children in Baja California, Mexico.

INTRODUCTION

- We recently documented a higher than suspected prevalence of HIV infection among pregnant women and a high mother-to-child HIV transmission rate at Tijuana General Hospital, in Baja California, Mexico.
- This study evaluated HIV-related disease progression in children identified through this program.

OBJECTIVES

- To assess temporal changes in morbidity and mortality among perinatally HIV-1 infected children in Tijuana, Baja California, Mexico

METHODS

- Children diagnosed with HIV infection and followed at the Pediatric HIV clinic at Tijuana General Hospital between 1998 and 2005 were observed longitudinally.
- Data on CD4 cell percentage, plasma HIV RNA log₁₀, antiretroviral treatment, morbidity and death were obtained.
- Median survival was calculated by the Kaplan-Meier method

RESULTS

Table 1. Study population

Gender	n	%
Male	32	52.5%
Female	29	47.5%

Substance use in parents	n	%
	20	32.3%

Age (years) at HIV diagnosis		
Mean	2.51 years (\pm 3.35)	
<1 year	21	34.3%
1	13	21.3%
2	5	8.2%
3	8	13.3%
4	4	6.6%
5-6	5	8.2%
7-10	3	3.9%
15-16	2	3.3%

Year of birth			Year of HIV diagnosis		
1986-89	3	4.9%	0	0%	
1990-94	3	4.9%	0	0%	
1995-96	5	8.2%	2	3.3%	
1997	4	6.6%	0	0%	
1998	4	6.6%	1	1.7%	
1999	3	4.9%	4	6.6%	
2000	6	9.8%	8	13.3%	
2001	9	14.8%	8	13.3%	
2002	9	14.8%	11	18.0%	
2003	7	11.5%	7	11.5%	
2004	4	6.6%	10	16.4%	
2005	4	6.6%	10	16.4%	

Table 2. Clinical conditions at HIV-diagnosis

CDC Class	n	%
A	15	24.6%
B	15	24.6%
C	31	50.8%

Pre-HIV hospitalizations	
0	21 34.4%
1	23 37.7%
2	7 11.5%
3	3 4.9%
4	7 11.5%

Causes of 74 pre-HIV hospitalizations*	
Pneumonia	42
Failure to thrive	17
Gastroenteritis	13
<i>Pneumocystis carinii</i> pneumonia	8
Tuberculosis	4

CD4+ lymphocyte percentage	
Mean	21.2%
Range	0 - 47%

CD4+ lymphocyte count (cells/mm ³)	
Mean	861.0
Range	2 - 4022

Mean plasma HIV-1 RNA load (log ₁₀ copies/ml)	
Mean	5.28
Range	2.74 - 7.12

Lymphoid interstitial pneumonia	4
Cytomegalovirus	1
Thrombocytopenia	1
Sepsis	1
Syphilitic pneumonia	1
Head Abscess	1
Omphalitis	1

*A given patient may have more than one diagnosis

Figure 1. CD4 percent, viral load and indication for hospitalization

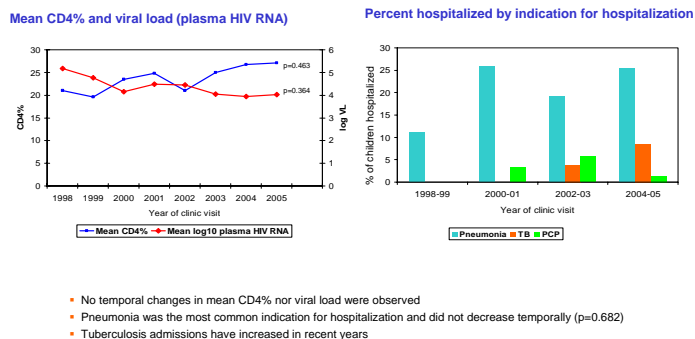
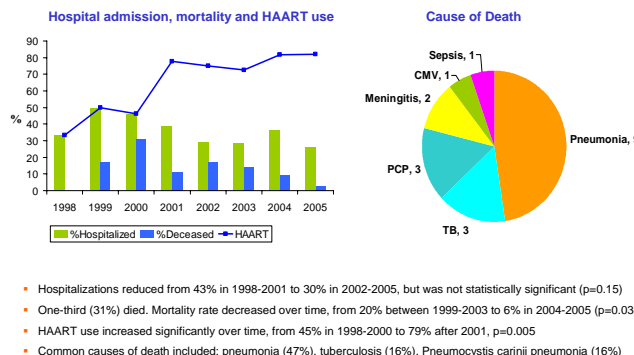
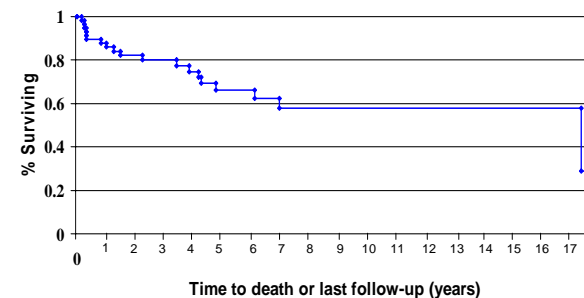


Figure 2. Hospitalization, Mortality and Cause of death



- Hospitalizations reduced from 43% in 1998-2001 to 30% in 2002-2005, but was not statistically significant (p=0.15)
- One-third (31%) died. Mortality rate decreased over time, from 20% between 1999-2003 to 6% in 2004-2005 (p=0.03)
- HAART use increased significantly over time, from 45% in 1998-2000 to 79% after 2001, p=0.005
- Common causes of death included: pneumonia (47%), tuberculosis (16%), *Pneumocystis carinii* pneumonia (16%)

Figure 3. Median survival: birth to death or last follow-up



- 19/61 (31%) children died.
- Mean age at death was 3.16 years (range: 2 months - 17.3 yrs)
- 1 year survival was 86%; 2 year survival was 80%
- Two-thirds (66%) survived to their 5th birthday

Table 3. Risk Factors Associated with mortality

Covariate	Adjusted OR	95% CI	p-value
CD4% (most recent)	1.17	1.04 - 1.33	0.011
Viral load (most recent)	0.25	0.07 - 0.90	0.034
Year of diagnosis	2.01	1.08 - 3.74	0.027
HAART use	1.91	0.19 - 18.4	0.577
No. of hospitalizations	1.61	0.55 - 4.66	0.382
Pneumonia	0.23	0.02 - 3.42	0.284
Tuberculosis	0.10	0.004 - 2.47	0.162

Multivariable regression showed that CD4 percent, viral load and year of HIV diagnosis were associated with mortality, after adjusting for HAART use, number of hospitalizations, pneumonia or tuberculosis.

CONCLUSIONS

- These findings indicate a high morbidity at the time of HIV diagnosis, and a high but declining mortality in this cohort of perinatally HIV infected children at Tijuana General Hospital.
- Low CD4 % and high HIV load were independently associated with risk of death among perinatally infected children at Tijuana General Hospital, Baja California, Mexico.
- Combination antiretroviral therapy increased over time concurrently with the decline in mortality.

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