

# Home Intravenous Antibiotic Treatment for Intractable Cholangitis in Biliary Atresia

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# Background

## Cholangitis

common complication during follow up of biliary atresia after Kasai operation

## Intractable Cholangitis (IC)

- uncontrolled cholangitis by routine conservative treatment
  - may cause biliary cirrhosis, hepatic failure, portal hypertension
    - most important and difficult complication in management after Kasai portoenterostomy
- : poor prognosis and the occasional requirement of liver transplantation

## Intrahepatic Biliary Cyst

may be the source of biliary infection

# Background

## Management of intractable cholangitis and intrahepatic biliary cysts

- many surgical or medical trials to control cholangitis and intrahepatic biliary cysts
- no treatment of choice of intractable cholangitis or intrahepatic biliary cysts

# Purpose

- review of the effects and the role of home intravenous antibiotic treatment (HIVA) in 8 patients of post-Kasai intractable cholangitis with biliary atresia
- suggestion of HIVA as an effective method for management of intractable cholangitis and intrahepatic biliary cysts in post-Kasai patients

# Methods

## retrospective review of medical records

for whom

- treated by HIVA for IC after successful Kasai portoenterostomy with BA
- from 1998 to 2008
- at Severance Hospital and Yongdong Severance Hospital

## diagnostic criteria of cholangitis

- 1) clinical symptoms such as fever, abdominal pain, jaundice or acholic stool
- 2) laboratory data such as hyperbilirubinemia, elevated liver enzyme or isolation of bacteria on blood culture
- 3) without other fever focus such as upper respiratory tract infection or urinary tract infection

# Methods

## diagnostic criteria of intractable cholangitis

recurrent cholangitis unresponsive to conservative management  
with intravenous antibiotics treatment

1) duration of admission for treatment longer than 1 month

2) three times of admission due to cholangitis  
with duration between previous discharge and readmission  
less than 1 month

## detection of intrahepatic biliary cyst

Abdominal ultrasonography

Abdominal CT

## central venous catheter indwelling

during the HIVA treatment



# Results

## HIVA program in the patients diagnosed as IC

after insertion of central venous catheter  
with help of home care nursing in 10 cases

two patients of initial period of HIVA were not followed up  
because of transfer to other hospital

## Duration of HIVA

from 8 to 39 months with median value of 13.5 months

two patients on HIVA  
duration of 8 months for one patient and 15 months for the other

six patients off HIVA  
from 8 to 39 months of duration with median value of 14 months

## Clinical Characteristics of Patients on HIVA

Patient Number	Sex	Age of Kasai op. (months)	Age of IC (months)	IHC	Age of HIVA (months)	Duration b/w IC – HIVA (months)
1	F	2 $\frac{1}{3}$	6	Y	60	44
2	M	2 $\frac{2}{3}$	5	Y	33	28
3	F	2	8	Y	10	2
4 <sup>1)</sup>	F	1 $\frac{1}{2}$	5	Y	9	4
5	F	1 $\frac{1}{3}$	12	Y	12	0
6	F	1 $\frac{1}{2}$	4	Y	5	1
7	F	1 $\frac{2}{3}$	12	N	13	1
8	F	2 $\frac{1}{2}$	35	Y	36	1

IC : intractable cholangitis

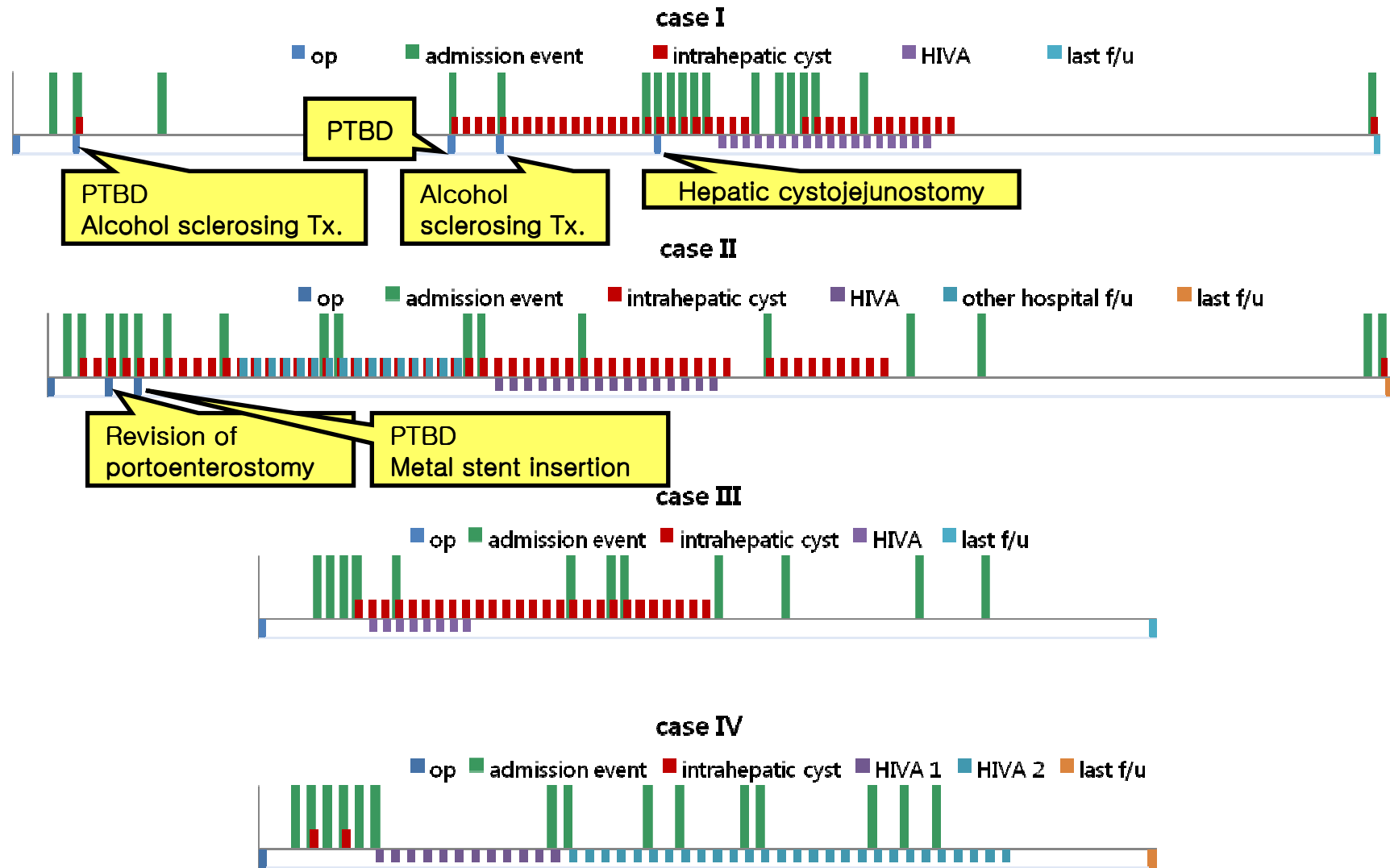
IHC : intrahepatic cyst

HIVA : home intravenous antibiotic treatment

1) Kasai op. at other hospital



# Clinical Courses



# Clinical Courses

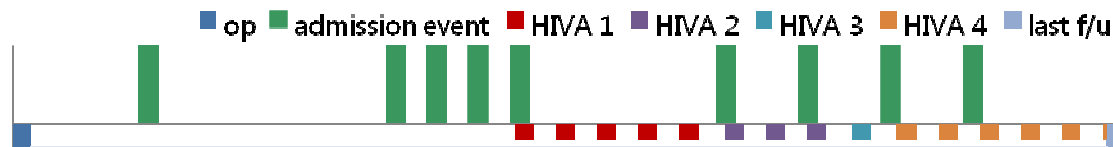
## case V



## case VI



## case VII



## case VIII



## Short-term Results of HIVA

Patient Number	Duration of HIVA (months)	Disappearance of IHC <sup>1)</sup>	Duration of Initial Ch.-free Status after HIVA (months)
1	18	Y	42
2	16	Y	13
3	8	Y	13
4	39	Y	13
5	9	Y	52
6	12	Y	31
7	15 (on Tx.)	- <sup>2)</sup>	3
8	8 (on Tx.)	N	3

IHC : intrahepatic cyst

Ch. : cholangitis

1) detected by imaging studies (abd. U/S or CT)

2) no previously detected intrahepatic cyst

## Effect of HIVA on Admission Rate due to Cholangitis

Patient Number	Duration of Admission <sup>1)</sup> before HIVA (days)	Duration before HIVA (months) <sup>2)</sup>	Admission Ratio <sup>3)</sup> before HIVA	Duration of Admission <sup>1)</sup> after HIVA (days)	Duration after HIVA (months) <sup>4)</sup>	Admission Ratio <sup>3)</sup> after HIVA
1	318	73	4.4	7	36	0.2
2	287	29	9.9	58	55	1.1
3	109	12	9.1	102	51	2.0
4	232	45	5.2	0	9	0.0
5	93	15	6.2	0	43	0.0
6	67	13	5.2	0	26	0.0
7	70	10	7.0	61 <sup>5)</sup>	13	4.7
8	141	30	4.7	26 <sup>5)</sup>	8	3.3
Median	125	22	5.7	16.5	31	0.6

1) Admission due to cholangitis

2) Duration from diagnosis of intractable cholangitis to HIVA

3) Admission days / duration in months

4) Duration from HIVA to last follow up

5) Admission during HIVA

# Results of HIVA

Effect of HIVA on Admission Rate due to Cholangitis

Admission Ratio  
(Admission days / duration in months)

Before HIVA	After HIVA	P-Value <sup>1)</sup>
5.7 (4.4 – 9.9)	0.6 (0.0 – 4.7)	0.012

1) Wilcoxon Signed Ranks Test

## Long-term Results of HIVA

Patient Number	Duration of Follow-up after HIVA (months)	Ch. on Last Follow-up	Duration of Last Ch.-free Status after HIVA (months)	Recurrence of IHC <sup>1)</sup>	Duration of IHC-free Status (months)
1	37	Y	42	Y	35
2	47	Y	27	Y	34
3	51	N	12	N	33
4	9	N	13	N	50
5	43	N	52	N	42
6	24	N	31	N	32
7	-2)	N	3	-3)	-3)
8	-2)	N	3	-2)	-2)

Ch. : cholangitis, IHC : intrahepatic cyst

1) detected by imaging studies (abd. U/S or CT)

2) on HIVA treatment

3) no previously detected intrahepatic cyst

# Long-term Results of HIVA

Patient Number	Age on Last Follow-up (yrs)	T.Bb (mg/dL)	Alb (g/dL)	PT (INR)	Ascites*
1	10	1.1	3.9	1.28	N
2	8	0.7	3.9	1.55	N
3	5	0.6	5.0	1.02	N
4	4	0.9	4.9	0.99	N
5	5	2.1	3.1	1.06	N
6	3	0.7	5.2	1.15	N
7	2	0.9	3.9	1.13	N
8	3	1.2	3.5	1.16	Sm

T.Bb : serum total bilirubin, Alb : serum albumin

PT : prothrombin time, INR : international normalized ratio of PT

Sm : small amount of ascites, \* : detected in U/S or CT

# Summary

- Intractable cholangitis after successful Kasai portoenterostomy can be controlled by HIVA treatment with statistically significant reduction of admission period due to cholangitis ( $p=0.012$ ).
- The duration of cholangitis free in HIVA-off group ranged from 12 to 52 months (median value of 29 months).
- Intrahepatic cysts related to intractable cholangitis also can be controlled and disappeared by HIVA treatment.
- Hepatic function is maintained good in all 8 patients of HIVA.



# Conclusion

- HIVA may be an effective primary treatment for intractable cholangitis after Kasai operation in biliary atresia.
- All of the 8 patients with HIVA for IC have tolerable hepatic function by control of cholangitis and following biliary cirrhosis. No patient required liver transplantation due to chronic liver disease or hepatic failure.
- Early application of HIVA to intractable cholangitis may help to maintain the hepatic function without recurrence of cholangitis or intrahepatic biliary cysts.
- Early detection of intrahepatic biliary cysts or early diagnosis of intractable cholangitis are necessary for early HIVA application.