

A Case of Infective Endocarditis Caused by *Haemophilus paraphrophilus*

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Haemophilus paraphrophilus is a normal inhabitant of the naso- and oropharynx and has been rarely reported as a cause of endocarditis. *H. paraphrophilus* is a slow-growing and fastidious gram-negative bacterium and belongs to the HACEK group. We experienced a case of infective endocarditis due to *H. paraphrophilus*. The organism was repeatedly isolated from the blood cultures of a 60 year-old patient presenting with high fever, chills, cardiac murmur, and change of mental state. The patient had a history of mitral and tricuspid valve replacements and had been followed up for complications of cirrhosis of liver such as esophageal varix and oral bleeding. The isolate was identified as *H. paraphrophilus* by the characteristics, including factor V requirement, negative indole, urea and ornithine decarboxylase and acid production from glucose and lactose. Antimicrobial susceptibility testing by the disk diffusion method showed that the organism was susceptible to ampicillin, chloramphenicol, tetracycline, trimethoprim/sulfamethoxazole, cefotaxime, ceftazidime, aztreonam, imipenem, and ciprofloxacin. The patient expired on hospital day 8, probably due to complications of cirrhosis of liver. To our knowledge, this is the first case of infective endocarditis caused by *H. paraphrophilus* in Korea.

(Korean J Clin Microbiol 1999;2:95~100)

Key words : *Haemophilus paraphrophilus*, the HACEK group, endocarditis*Haemophilus paraphrophilus*

[1,2], *Haemophilus aphrophilus*, *Actinobacillus actinomycetemcomitans*, *Cardiobacterium hominis*, *Eikenella corrodens*, *Kingella kingae*, HACEK group
 . HACEK group
 ,
 48-72
 , CO₂
 ,
 가 [1-4]. *H.*

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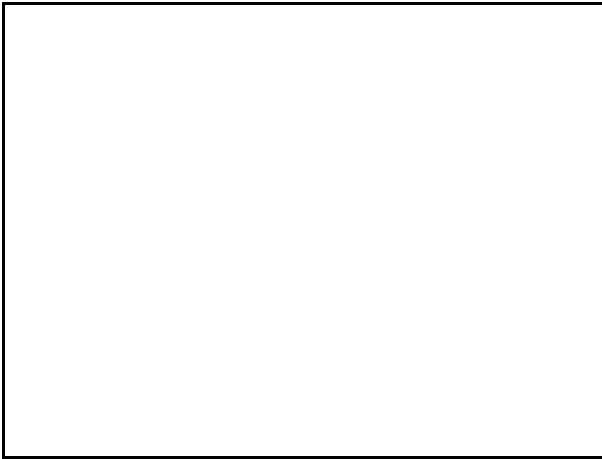


Fig.1. Colonies of *H. paraphrophilus* isolate on chocolate agar after 48 hours growth.

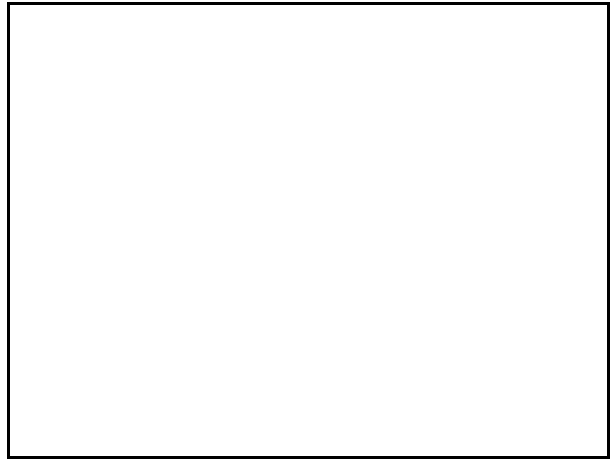


Fig.2. Gram stain finding of the isolate showing short, pale-staining gram-negative coccobacilli.

paraphrophilus

17 가
가 [3].
60 *H. paraphrophilus*
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: 60 , .
: , , , .
: 4 39 ,
가 .
: 1983
 , 가
가
가 : .
:
80/40mmHg, 92
/ , 22 / , 39 .
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2 .
: 12,200/mm³(
85%), 8.7g/dL, 7,000/mm³,
24.1% . 67mm/hr, CRP 19.4mg/dL
가 aPTT 52.8 , PT
33.2/13.3/3.60(%/INR), 409.6mg/dL .

6.2g/dL, 3.1g/dL, AST 33U/L, ALT 18U/L, LD 1071U/L, 11.9 mg/dL, 6.9mg/dL, gamma-GT 19U/L, BUN 89.7mg/dL, 1.7mg/dL, CK 20U/L, CK-MB 17U/L, myoglobin 48.9ng/mL troponin-T . Na/K/Cl 143/2.8/105 mEq/L HBsAg, HBeAg, Anti-HBs, Anti-HBc Anti-HBe , Anti-HCV 30-39 / ×400 . , (vegetation) 가 , 가 . : 2 (VITAL, bioMerieux, France) , 5 . , MacConkey chocolate , MacConkey , chocolate 48 (Fig. 1).

(Fig. 2), *Staphylococcus aureus* . V X V X V 가 strip indole, urease ornithine decarboxylase , oxidase nitrate , catalase . Glucose, maltose,

Table 1. Characteristics of the isolate and comparison with profiles of the HAECK group organisms^a

Characteristic	<i>Haemophilus paraphrophilus</i>	<i>Haemophilus aphrophilus</i>	<i>Actinobacillus actinomycescomitans</i>	<i>Cardiobacterium hominis</i>	<i>Eikenella corrodens</i>	<i>Kingella kingae</i>	The isolate
Oxidase	₋ ^b	₋ ^b	₋ ^b	+	+	+	+
Catalase	-	-	+	-	₋ ^b	-	-
Nitrate reduction	+	+	+	-	-	-	+
Requirement for							
X-factor	-	-	-	-	-	-	-
V-factor	+	-	-	-	-	-	+
Indole	-	-	-	+	-	-	-
Urease	-	-	-	-	-	-	-
Ornithine decarboxylase	-	-	-	-	+	-	-
Lysine decarboxylase	-	-	-	-	+	-	-
ONPG	+	+	-	-	-	-	+
Acid production from							
Glucose	+	+	+	+	+	+	+
Maltose	+	+	v	v	+	+	+
Sucrose	+	+	-	+	-	-	+
Lactose	+	+	-	-	-	-	+
Mannose	+	+	+	+	-	-	+
Mannitol	-	-	v	v	-	-	-
Xylose	-	-	v	-	-	-	-

^a Data from reference [1].

^b Few stains may produce weak or delayed positive reactions.

Abbreviations and symbols: +, positive reaction; -, negative reaction; v, variable reaction; ONPG, orthonitrophenyl-β-D-galactopyranoside.

sucrose, mannose lactose
mannitol xylose
Haemophilus species HACEK *H. paraphrophilus* (Table 1 2). API NH system(bioMerieux, France) 7 1 6 2(glucose, fructose, maltose saccharose , ornithine decarboxylase urease , alkaline phosphatase, alpha galactosidase
 , proline arylamidase gamma glutamyl transferase indole) *H. aphrophilus/paraphrophilus*(very good identification)
 . beta-lactamase test
Haemophilus test medium
 ampicillin, trimethoprim/ sulfamethoxazole, cefotaxime, tetracycline, chloramphenicol, ceftazidime, aztreonam, imipenem, ciprofloxacin

가 가 , HACEK group [3]. HACEK group 3%
[4]. HACEK group
Haemophilus parainfluenza, *C. hominis*, *A. actinomycetemcomitans* *H. aphrophilus* ,
H. paraphrophilus [4].
1968 Zinneman [5] 가 CO₂
 , V *Haemophilus* species *H. paraphrophilus* . 1976 de Silva [6]
가 24
H. paraphrophilus
 . *H. paraphrophilus* [3], HACEK group *H. aphrophilus* *Haemophilus parainfluenzae* 1

Table 2. Key biochemical and physiologic characteristics of the isolate and *Haemophilus* species^a

Species and biotypes	Factor requirement		Hemolysis	D-Glucose, acid	Lactose, acid	Urease	Indole	Ornithine decarboxylase	Catalase	Oxidase
	X	V								
<i>Haemophilus influenzae</i>	+	+	-	+	-	v	v	v	+	v
<i>Haemophilus haemolyticus</i>	+	+	+	+	-	-	+	v	+	+
<i>Haemophilus parahaemolyticus</i>	-	+	+	+	-	-	+	-	+	v
<i>Haemophilus parainfluenzae</i>									v	v
biotype	-	+	-	+	-	-	-	+		
biotype	-	+	v	+	-	+	-	+		
biotype	-	+	v	+	-	+	-	+		
biotype	-	+	-	+	-	+	+	+		
biotype	-	+	-	+	-	-	+	+		
biotype	-	+	-	+	-	+	+	-		
biotype	-	+	-	+	-	-	+	-		
<i>Haemophilus paraphrophilus</i>	-	+	-	+	+	-	-	-	-	v
<i>Haemophilus segnis</i>	-	+	-	v	-	-	-	-	v	-
<i>Haemophilus ducreyi</i>	+	-	-	-	-	-	-	-	-	+
The isolate	-	+	-	+	+	-	-	-	-	+

^a Data from reference [2].

Abbreviations and symbols: See Table 1.

[7,8], *H. paraphrophilus* 가 *H. paraphrophilus*가 pitting
E. corrodens
H. paraphrophilus HACEK group [9]. *H. paraphrophilus* V V
HACEK group (dental plaque) [1,2]. *H. paraphrophilus* catalase
oxidase [1,2]. V
H. aphrophilus HACEK
group
H. paraphrophilus V
, lactose
(38%), (20%), (60%) mannose *Haemophilus* spp.
(27%) [4]. *Haemophilus* spp.
[1,2]. V
H. paraphrophilus *H. parahaemolyticus*, *H. parainfluenzae* *Haemophilus segnis*가 *H. parahaemophilus*, lactose
, urease , *H. segnis* lactose
mannose *H. paraphrophilus* *H. parainfluenzae*
urease, indole ornithine , nitrate
[2]. HACEK group mannose
HACEK group urease, indole ornithine 가 [1,2].
Hammond [10] *H. paraphrophilus* *H.*

parainfluenzae de Silva [6]
10% CO₂가 xylose
H. parahaemophilus
H. paraphrophilus CO₂
, lactose
H. parainfluenzae indole, urease, ornithine
decarboxylase 가
H. paraphrophilus 가 가
[1,2].
API NH system *H. aphrophilus*/
paraphrophilus(very good identification) API
NH system V X
가 .
chocolate S.
aureus
API NH system
V X
H. paraphrophilus , ,
, , , ,
[1-4].
[11], 17 16
[3]. *H. paraphrophilus*
71%
가 35% 가 , (18%)
(18%) , ,
[3]. *H. paraphrophilus*
17 3 가
[3].
가
H. paraphrophilus penicillin, ampicillin,
tetracycline, chloramphenicol, streptomycin
aminoglycosides [3,6,10,11].
penicillin ampicillin 가 β
-lactamase 가 [3,12].
H. paraphrophilus 17 β
14 β-lactam
β-lactam [3].
β-lactamase Coll-Vinent [3]
H. paraphrophilus

1 , cefotaxime
netilmicin .
ampicillin
β-lactam β-lactam
가 .
5
가 ,
가 8
.
H. paraphrophilus
.
HACEK group *Haemophilus* spp.
60
H. paraphrophilus 1
.
H. paraphrophilus
,
,
V , indole, urea
ornithine decarboxylase , glucose lactose
H. paraphrophilus
ampicillin
.
가 ,
가 8
.
H. paraphrophilus

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