

# 가 BCG 가

## - PPD -

= Abstract =

### Tuberculin Reactivity in Neonates Vaccinated with BCG at Primary Care Clinics - With Two Types of BCG Vaccine and Two Strengths of PPD -

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**Purpose :** The number of newborns vaccinated with BCG of Tokyo 172 strain, which has been claimed to cause lesser degree of local adverse events including scar, has recently been increasing. However, tuberculin response to this vaccine has inadequately been studied, especially with newborns cared at primary care clinics. We, therefore, performed a study in newborns vaccinated with BCG at private pediatric offices and evaluated the response to PPD 2TU or PPD 5TU following vaccination with percutaneous or intradermal BCG.

**Methods :** Two hundred infants who had been cared at three private pediatric offices were retrospectively enrolled in the study. One hundred fifty one infants had received percutaneous BCG(Tokyo strain); 129 infants had had tuberculin test with PPD 2TU and the rest of 22 infants with PPD 5TU. Forty nine infants had received intradermal BCG(28 infants Copenhagen strain, 1 infant French strain, 20 infants unknown); 35 infants had had tuberculin test with PPD 2TU, 14 infants(11%) with PPD 5TU.

**Results :** In infants vaccinated with percutaneous BCG, the mean induration diameter in tuberculin test was significantly greater with PPD 5TU(12.4±3.5mm) compared to PPD 2TU (9.2±4.4mm). In infants vaccinated with intradermal BCG, the mean induration diameters in tuberculin test were 5.7±5.1mm to PPD 2TU and 6.6±4.8mm to PPD 5TU, which were not significantly different. The tuberculin response to PPD 2TU was significantly greater in infants vaccinated with percutaneous BCG compared to those with intradermal BCG. The tuberculin response to PPD 5TU was also significantly greater in infants vaccinated with percutaneous BCG compared to those with intradermal BCG.

**Conclusion :** Percutaneous BCG(Tokyo strain) seems to cause greater response to tuber-

culin compared to intradermal BCG and PPD 2TU induces weaker response compared to PPD 5TU. Acknowledging some discrepancies from the previously reported data, which might have been due to the different source of the study subjects, more studies are needed to establish the range of tuberculin response following BCG vaccination in order to differentiate from tuberculosis.

Key Words : BCG, PPD, Tuberculin response, Tuberculosis

1.

1997 2 2001 6  
1 BCG  
200

Tokyo 172  
copenhagen French 1173P  
BCG BCG  
1990 1.8%, 1995 1.0% 30  
1990 27.3%, 1995 15.5%<sup>1)</sup>

1998 PPD 5TU  
PPD 2TU  
26G PPD 0.1  
mL 6~10 mm  
PPD 48~72

BCG  
BCG  
가 5 mm  
, 5 mm

2.

SPSS 8.0  
t-test P<0.05

BCG 가 tokyo 172  
BCG 가

BCG 가 BCG  
BCG 가 BCG  
BCG , 5TU PPD 2TU PPD  
200 112 (56%), 88  
(44%) BCG 16~36 (  
26.1±9.9 ) PPD  
4.9±3.6 BCG PPD  
4.0±3.6  
200 Tokyo 172 (Japan BCG Labra-

Table 1. Strains of BCG Vaccines and PPD Strength Utilized in the Study

BCG strain	Route of administration	PPD Strength	
		2TU	5TU
Tokyo172	Subcutaneous	129(64.5%)	22(11.0%)
Copenhagen	Intradermal	22(11.0%)	6( 3.0%)
French 1173P2	Intradermal	1( 0.5%)	0( 0.0%)
Unknown	Intradermal	12( 6.0%)	8( 4.0%)

tory Co.) 가 151 (75.5%)  
 . 49 (24.5%) { France Me-  
 rieux copenhagen 1331 28 (14%),  
 French 1173P2 1 (0.5%), 20 (10%) }  
 Tokyo 172 151 2TU PPD  
 가 129 (64.5%), 5TU PPD  
 가 22 (11.0%) , copenhagen  
 28 2TU PPD 가 22 (11.0  
 %), 5TU PPD 가 6 (3.0%) ,  
 French 1173P2 1 (0.5%)  
 2TU PPD . BCG  
 2TU PPD 가 8 (4.0%), 5TU  
 PPD 가 12 (6%) (Table 1).

(Fig. 1, 2) BCG BCG  
 PPD 2TU PPD 5TU  
 BCG 2TU PPD  
 5TU PPD ( )  
 9.2±4.4 mm(86.8%), 12.4±3.5 mm(95.5%) 5TU  
 PPD 2TU PPD  
 (P=0.02) 0  
 BCG 2TU PPD 5TU PPD  
 ( ) 5.7±5.1 mm(60.0  
 %), 6.6±4.8 mm(71.4%)  
 가 (P=0.569).

, 2TU PPD  
 BCG ( )  
 9.2±4.4 mm(86.8%), BCG  
 5.7±5.1 mm(60.0%) BCG  
 BCG  
 (P<0.001). 5TU PPD

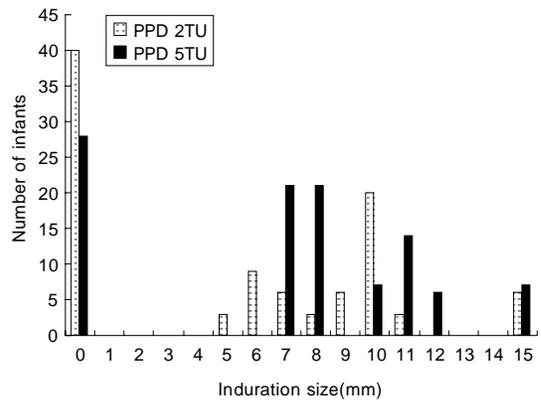


Fig. 1. Distribution of induration diameter on tuberculin tests in infants vaccinated with intradermal BCG.

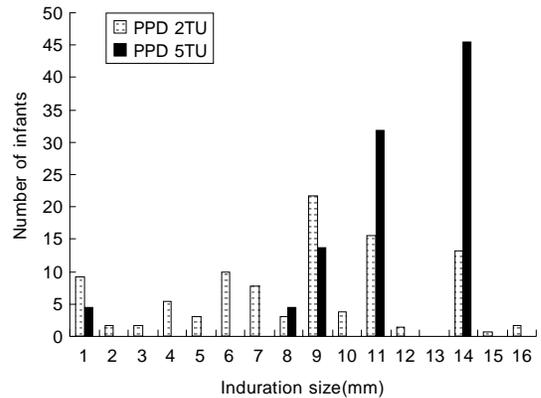


Fig. 2. Distribution of induration diameter on tuberculin tests in infants vaccinated with percutaneous BCG.

BCG ( )  
 12.4±3.5 mm(95.5%), BCG  
 6.6±4.8 mm(71.4%) BCG  
 BCG

Table 2. Magnitude of Induration on Tuberculin Test Performed after BCG Vaccination

Route of BCG vaccination	PPD strength					
	2TU			5TU		
	n	Induration*	%Positive	n	Induration*	%Positive
Percutaneous(n=151)	129	9.2±4.4 mm	86.8%	22	12.4±3.5 mm	95.5%
Intradermal(n=49)	35	5.7±5.1 mm	60.0%	14	6.6±4.8 mm	71.4%

\*mean± D

(P< 0.001, Table 2).

75%

<sup>12)</sup> Tokyo 172

45

(virulence)

가

가

BCG

1930

1970

0~80%

,

가

WHO가

8 ~ 10

가

<sup>3)</sup>

172 가

<sup>13)</sup>

Tokyo

BCG

BCG

가

가

BCG

53~74%

<sup>4-9)</sup>

가

BCG

6

,

417 가

84

(20.1%)

BCG

806

가

45 (5.6%)

74%

. 1940

<sup>10)</sup>

90%

4

40

가 BCG

French 1173 P2, Danish 1331,

1990

BCG가

Glaxo 1077 Tokyo172

, French

가

1173 P2 Danish 1331

Glaxo 1077 Tokyo172

가

<sup>11)</sup> BCG

WHO가

, BCG

가 가

Glaxo

가

1077 60~80%, Tokyo 172

60~95%

. 1890 Robert Koch

Glaxo 1077 24~50%, Tokyo 172

M. tuberculosis

39~53%

French 1173 P2 70~

12.4±3.5 mm

Seibert Munday<sup>14)</sup> (95.5%) BCG

UNICEF PPD 1958 가 BCG

PPD RT23 Statens Serum Institute(SSI, copenhagen) 5.7±5.1 mm(60.0%) 2000<sup>19)</sup> 7.7±2.3 mm(80.7%)

<sup>15)</sup>, 1960 가 BCG 2TU PPD

1TU PPD RT23 9.2±4.4 mm(86.8%) BCG 2TU PPD

RT23 BCG 5TU PPD BCG 5TU PPD

. 1998 2TU PPD RT23 가 PPD 5TU가 PPD

, BCG PPD 2TU

BCG 가 BCG PPD

1331) BCG(Copenhagen) 가 , 2TU PPD 5TU

PPD 5TU 1993 PPD 2TU PPD

<sup>16)</sup> 10.6±3.8 mm(85.8%), 1997 <sup>13)</sup> ( ) , 7.2±4.4 mm(75.8%) 가

BCG(French 1173P2) BCG

가 1997<sup>17)</sup> 84.2% BCG

가 PPD 5TU 6.6±4.8 mm(71.4%) 가

BCG PPD 5TU 가

가 1997 가

1997<sup>13)</sup> 10.3±3.2 가

mm(97.7%), 2000<sup>18)</sup> 가 10.6±3.9 mm(93.7%) BCG

BCG 가 : BCG



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