

survivin, bcl-2, bax

survivin, bcl-2, bax

50

survivin, bcl-2, bax

surviving, bcl-2, bax

: survivin	26 (52%)	
, bcl-2 23 (46%), bax 21 (42%)	. Survivin bcl-2	
19 (38%), survivin bax	13 (26%), bcl-2 bax	
8 (16%), 3가	8 (16%)	3

가

bcl-2 (P=0.04), survivin bcl-2†

(P=0.044)

bcl-2 (P=0.001), survivin bcl-2†

(P=0.027)

Kaplan-Meier bcl-2 (P=0.0012) survivin, bcl-2

(P=0.0075)

: , bcl-2

, survivin bcl-2

: , survivin, bcl-2, bax,

가

(condensation), survivin, bcl-2, bax
DNA (fragmentation),
(shrinkage)

(cystein protease)

1.

1996 3 1999 8

survivin

50

2).

32 , 18 21.7

survivin (4~81) 34 ,
가 9 , 3 , 2 , 1 ,

1,2,8,16,21,23)

1

Bcl-2 B- (follicular B-cell) 34 , 7 , 3 ,
14:18 (translocation) 3

1 Enneking
stage IB 1 , IIA 1 , IIB 4 ,
가 II가 4

25,26)

bcl-2

1

3,6,9,14,15)

Huvos grade III IV가 20 , I II
가 29

Bax 19

p53- (domain) 가

. Bax bcl-2 21%

(mar-

(homology) 가

ginal margin) 1 ,

가 , 21-kd

(inadequate wide margin) 3 ,

. Bax

(adequate margin) 46 .

bcl-2/bax

26 가

bcl-2

bcl-2

30 가 , 8

17,19)

50

36.9 (6~100) .

26 , 8 , 16 .

2. biotin 2 1
 . PBS peroxidase-con
 jugated streptavidin 30
 . PBS DAB (3,3-
 diaminobenzidine tetrahydrochloride)
 hema-
 toxylin (Sigma, St. Louis, MO, USA)
 ,
 , , 5
 ,
 ,
 2)

1)
 , 10
 5 μ m
 xylene ethanol 10% (Fig. 1).
 . Phosphate buffered saline (PBS)
 endogenous peroxidase 3)
 0.3% hydrogen peroxide 15
 PBS .
 4
 1 1 4 overnight ((2)
 Histostain -Plus Kits
 (Zymed Laboratories Inc., San Francisco, CA, USA) , 1 survivin
 (Abcam, Cambridgeshire, UK), bcl-2
 (Santa-Cruz Biotechnology, Santa-Cruz, CA,
 USA), bax (Santa-Cruz Biotechnology)
 1:100 . PBS survivin

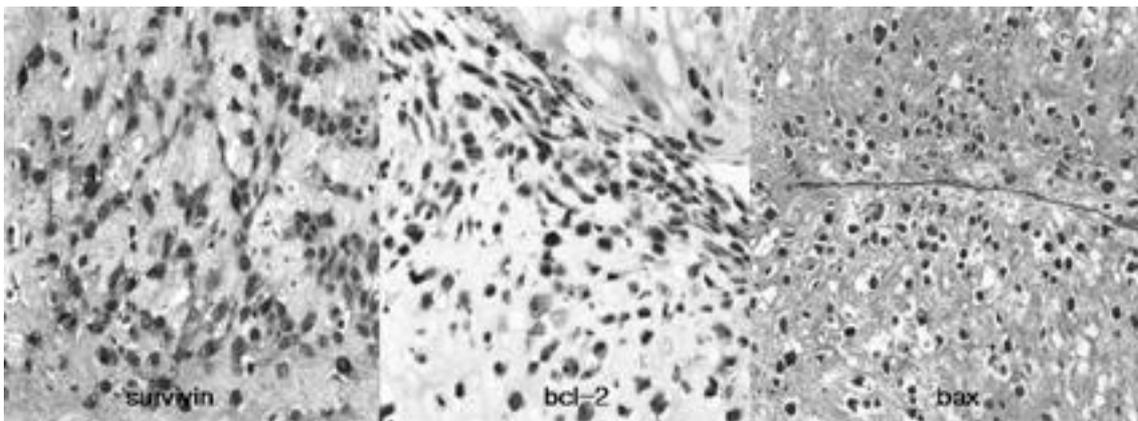


Fig. 1. Immunohistochemical staining of survivin, bcl-2 and bax shows an example of positive staining (\times 200).

Table 1. Correlation between apoptosis related gene expression and clinicopathologic factors

Variable	Cases	Survivin positive (26)	Bcl-2 positive (23)	Bax positive (21)	Survivin and bcl-2 positive (19)	Bcl-2 and bax positive (7)	Survivin, bcl-2 and bax positive (8)
Response to chemotherapy							
< 90%	29	18 (62.1%)	18 (62.1%)	12 (41.4%)	15 (51.7%)	5 (17.2%)	5 (17.2%)
≥ 90%	20	8 (40.0%)	5 (25.0%)	9 (45.0%)	4 (20.0%)	2 (10.0%)	2 (10.0%)
		P = 0.252	P = 0.04	P = 0.377	P = 0.044	P = 0.685	P = 0.685
Oncologic outcome							
Death of disease	16	11 (68.7%)	13 (81.2%)	5 (31.2%)	10 (62.5%)	3 (18.7%)	3 (18.7%)
No evidence of disease	26	15 (46.8%)	10 (31.2%)	16 (50%)	9 (28%)	5 (15.6%)	5 (15.6%)
Alive with disease	8						
		P = 0.135	P = 0.001	P = 0.365	P = 0.027	P = 0.699	P = 0.699

survivin, bcl-2, bax

26 (52%), bcl-2 23 (46%), bax 21 (42%)

Survivin bcl-2 19 (38%), survivin bax 13 (26%), bcl-2 bax 8 (16%), 가 8 (16%)

37가

bcl-2 (P=0.04)

survivin bcl-2가 (P=0.044)

bcl-2 (P=0.001), survivin bcl-2가 (P=0.027)

(Table 1).

survivin bax

Kaplan-Meier bcl-2 (P=0.0012) survivin, bcl-2 (P=0.0075) (Fig. 2, 3).

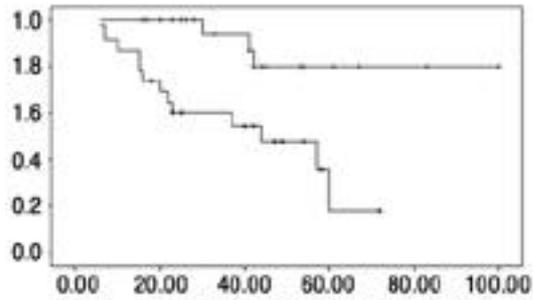


Fig. 2. Survival curves of bcl-2 expression showed negative correlation (P=0.0012).
+: bcl-2 negative, x: bcl-2 positive

가

survivin

survivin

survivin

12)

20)

2)

가

survivin

survivin

bcl-2, bax

10,13,22)

Survivin 80%가

20%가

survivin

4). Triebts

24)

survivin bcl-2

survivin

5

5

survivin 가

bcl-2

가

bcl-2 bax

survivin

4,27)

가

bcl-2

5
bax

bcl-2

survivin

18)

11) (transi

Bax bcl-2

tional cell carcinoma)

15)

bax

가

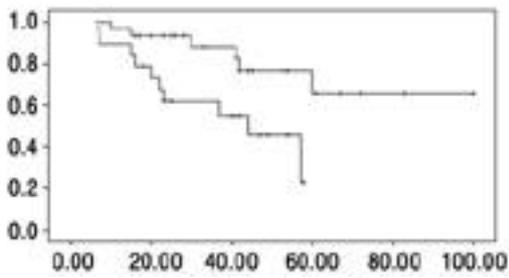


Fig. 3. Survival curves of survivin and bcl-2 coexpression showed negative correlation ($P=0.0075$).
 +: survivin and bcl-2 negative, x: survivin and bcl-2 positive

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and bax protein in epithelial ovarian cancer. *Zhonghua Fu Chan KezaZhi*, 38(4) 203-206, 2003.

Abstract**Expressions of Apoptotic Genes (survivin, bcl-2, bax) and Clinical Relevance in Osteosarcoma**

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Purpose: The expression of apoptosis-related genes, such as survivin, bcl-2, and bax has been examined in the human osteosarcoma and then evaluated the correlation with clinical data of patients.

Materials and Methods: Fifty human osteosarcoma specimens were established from incisional biopsy and examination of survivin, bcl-2, and bax by immunohistochemical study was performed. We investigated the correlation of survivin, bcl-2, bax and their two or three combined expressions with clinical data including the response of chemotherapy, local recurrence, distance metastasis, and oncologic outcome.

Results: Survivin was showed in 26 cases (52%), bcl-2 in 23 cases (46%), and bax in 21 cases (42%) osteosarcoma. And coexpression of survivin and bcl-2 was showed in 19 cases (38%), survivin and bax in 13 cases (26%), bcl-2 and bax in 8 cases (16%), and all three expression was showed in 8 cases (16%).

There was no correlation between their apoptosis related gene and histologic difference, the presence of local recurrence and distant metastasis. Whereas neoadjuvant chemotherapy response correlated with bcl-2 expression ($P=0.04$), and survivin and bcl-2 coexpression ($P=0.044$) with poor chemoresponse. The rate of died of disease was correlated with bcl-2 ($P=0.001$), survivin and bcl-2 coexpression ($P=0.027$) with bad outcome. Survival curves of bcl-2 ($P=0.0075$), survivin and bcl-2 ($P=0.0012$) was showed negative correlation in the Kaplan-Meier method.

Conclusion: The apoptosis related gene expression was relatively high in osteosarcoma, bcl-2 expression was correlated with poor chemotherapy response and poor survival rate, but survivin was correlated with this oncologic outcome only in the bcl-2 coexpression. The examination of immunohistochemical stain of apoptosis related gene in osteosarcoma could be helpful in the judgment of osteosarcoma prognosis.

Key Words: Osteosarcoma, Apoptosis related gene, survivin, bcl-2, bax, Clinical correlation

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