

Mass Screening is Inevitable to Detect the Curable Early Stage Prostate Cancer*

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Abstract: Objective To investigate the influence of the mass screening on the status of the prostate cancer (PCa), we compared the cases of PCa detected by the mass screening and the cases diagnosed at a conventional ordinary urologic outpatient. **Methods** Using a SPSS analysis system, We compared 67 cases of prostate cancer detected by mass screening and 358 cases diagnosed at the outpatient of various hospitals in Changchun in terms of age distribution, clinical stages, level of serum prostate special antigen (PSA), pathological stage and treatment modality. **Results** The annual average incidence of PCa during 1999 to 2001 increased 4.72 times when compared to the 1986 to 1989's. In the screening group, the cases with clinical stage T2 and T1 accounted for 59.7%. In the clinical group, it was only 28.0%, and mostly detected incidentally. Furthermore, in the screening group the percentage of the cases beyond 20 ng/ml PSA and of poorly differentiated carcinoma were much lower compared to the clinical group. These differences between them were statistically significant. The number of radical prostatectomy in the screening group increased 15.3% compared with that of the clinical group. **Conclusion** Only the mass screening can really reveal the actual prevalence of prostate cancer. It can markedly raise the number of prostate cancer, especially the cancer in the early stage.

Key words: prostate cancer; mass screening; PSA; radical prostatectomy

Prostate cancer (PCa) remains the most common malignant tumor in elderly men. In the United States it is the most commonly diagnosed cancer and is the second leading cause of cancer death in men behind cancer of the lung^[1]. In recent years, along with the prolonging of the average life, the changing of life style and the improving of detecting way, the incidence of PCa is outstanding increasing in China. To investigate the influence of mass screening for PCa on the factors of clinical PCa, we compare the cases of prostate cancer by mass screening detected and clinical diagnosed.

MATERIALS AND METHODS

1. Data's source

1.1 358 cases from clinic

Collect 358 cases diagnosed by hospitals of Changchun during the period from January 1986 through December 2001 (called the clinical group for short following).

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1.2 67 cases from the mass screening for PCA

Jilin University Prostate Diseases Prevention and Treatment Research Center, during the period from January 1996 through December 2001, performed a mass screening of PCA. A total of 12,027 men over 50 years old were carried out and 67 men were found to have cancer (called the screening group for short following). The total cases are 425.

2. Methods

2.1 Determination of serum PSA concentration

The commercial test kit (CanAg Sweden) was used to determinate serum PSA concentration.

2.2 The transrectal ultrasound-guided systematic sextant biopsy examination

In the screening group, if a man had a PSA concentration greater than 4.0ng/ml, the person is suspected. After signing the application form, the transrectal ultrasound-guided systematic sextant biopsy examination would be conducted by doctors. In the clinic al group the finger-guided biopsy examination is often conducted.

2.3 Statistical analysis

Data was indicated by average ± standard deviation, groups were compared by T-test and Chi-square test. Statistics were calculated using SPSS 10.0 (SPSS, Chicago, USA) and EXCEL2000.

RESULTS

1. The mass screening increased annual average cases of the clinical PCA greatly

From 1999 to 2001 there were 184 patients in total, increased 4.72 times compared with the cases from 1986 to 1989, increased 2.42 times compared with the cases from 1996 to 1998. The influence of the mass screening for PCA on the annual average cases of Clinical PCA was showed in Fig. 1.

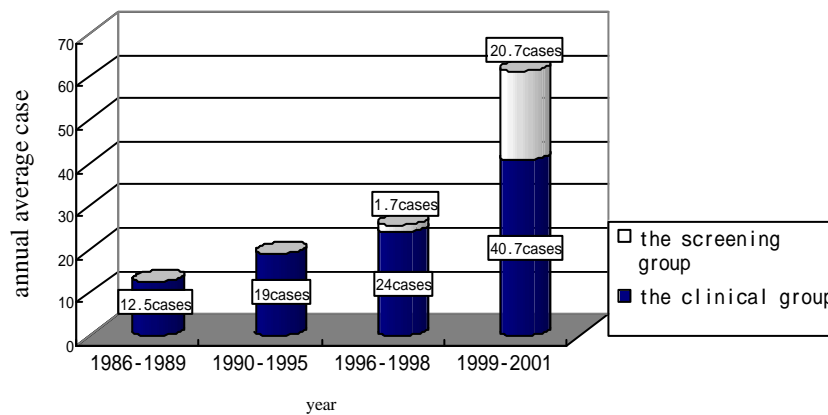


Fig.1 The influence of the mass screening for Pca on the annual average cases of Clinical Pca

2. The influence of the mass screening on stage TNM

The cases below stage T2 were 40 (59.7%), and over stage T3 were 27 (40.30%) in the screening group; the cases below stage T2 were 101 (28.2%), and over stage T3 were 257 (71.8%) in the clinical group; There was a significant difference by T-test ($p < 0.001$). It was showed in Table 1. But comparing the cases of metastasis there was no difference between them.

Table 1 The contrast table of stage TNM between the screening group and the clinical group (cases)

	T1	T2	T3	T4	N	M	Total
The screening group	18 26.9%	22 32.8%	9 13.4%	18 26.9%	2 3.0%	11 16.4%	67
The clinical group	55 15.4%	46 12.8%	92 25.7%	165 46.1%	30 8.3%	68 19.0%	358
Total	73 17.2%	68 16.0%	101 23.5%	183 43.1%	32 7.5%	77 18.1%	425

3. The analysis of the result of serum PSA testing: organ confined cancer

There were 100 cases which accepted the PSA testing among 425 cases. The average concentration was 35.85 ± 39.26 ng/ml. If the cut-off value was 4.0 ng/ml, the sensitivity of PSA was 88% (88/100).

Since 1996, 67 cases accepted the PSA testing in the screening group, the detection rate was 100% (67/67); and in the clinical group, the detection rate was only 12.7% (33/260). If we stratified PSA as >4.0~10.0 ng/ml, >10.0~20.0 ng/ml and >20.0 ng/ml, the percentages of the cases in the screening group with >4.0~10.0 ng/ml, >10.0~20.0 ng/ml were higher than in the clinical group. The difference was statistically significant ($p < 0.05$).

4. The comparison of the pathological stage between two groups

There were 212 cases which had the pathological stage through biopsy or operation. In the screening group the constituent ratios of well-differentiated cancer, moderately differentiated cancer and poorly differentiated cancer were 12.8%, 46.8% and 40.4% respectively; and in the clinical group the ratios were 9.7%, 32.1% and 58.2% respectively. There was a significant difference between them ($p < 0.01$).

5. The treatments of PCa

The orchiectomy is still the main method of the therapy of PCa. 195 cases underwent the operation in the clinical group; it contained 72.8% (195/268) among the cases of having undertaken the operation.

There were 15 cases undergone radical prostatectomy in total. There were 73% cases in the screening group (11/15) and 23% in the clinical group (4/11). In the screening group 16.4% (11/67) cases underwent radical prostatectomy and in the clinical group only 1.1% (4/358). There was a significant difference between them ($p < 0.01$).

DISCUSSION

A dramatic increasing in incidence of PCa occurred in U.S. since the introduction of PSA testing [2] and in China it appeared to be increasing rapidly as well [3]. In our study from 1999 to 2001 the diagnosed cases increased 4.72 times compared with the cases from 1986 to 1989. It showed the prostate cancer screening can improve the detection rate of PCa.

Stage TNM is the most in common use stage system in clinic of PCa [4]. Mettlin et al [5] summarized the result of the PCa screening for five years. 36% cases were Stage A, 56% cases were Stage B, 4% cases were Stage C and 4% were Stage D, and 86% of Stage D was in the beginning years. Our study showed that 74% cases were stage T3 or stage T4 in the clinical group; and 40.3% cases were over stage T3 in the screening group. In recent 3 years, cases of stage T1 and stage T2 were increased from 27.8% (67/241) to 40.2% (74/184) during the period from 1986 through 1998. It was clear that clinical PCa cases were almost advanced stage, and most accompany with metastasis; the high percentages of early stage cancer could be detected in the screening group. So performing PCa screening can detect more early stage PCa.

There was good evidence that PSA increases the detection rate of early stage prostate cancers [6]. The

proportion in PSA>20 group in the clinical group was higher than that in the screening group; The proportion in PSA>4.0~10.0 ng/ml and PSA>10.0~20.0 ng/ml groups in the clinical group were lower than that in the screening group. It suggested that the PCa screening can improve the detection rate of earlier stage cancer through PSA testing.

Pathologic diagnosis of PCa is the keystone on which its further management is based. The use of PSA-based screening has significantly affected the patterns of PCa diagnosis. In the cases which have the pathological stage, the constituent ratios of well-differentiated cancer and moderately differentiated cancer in the screening group were obviously higher than that in the clinical group with a significant difference between them ($p<0.01$). Moderately differentiated cancers accounted for the majority of the screening group. It showed that the PCa screening can raise the detection rate of earlier stage cancer.

The study suggested the cases in the clinical group often use the treatment of orchiectomy, because the clinical PCa was almost advanced stage cancer or incidental PCa, so the prostatectomy undergoing rate was only 1.1% (23% in total). In recently years, followed by the development of the mass screening for PCa, diagnosis in earlier stage became the reality, and the rate rose to 16.4% (73% in total). Because early diagnosis offers the hope of a possible cure, the PCa screening can improve the cure level of PCa.

Suffice it to say that PCa is a widely occurring disease in men and early detection and treatment are extremely important, because early detection and treatment remain our best hope for the cure of PCa. Only by the mass screening used of PSA testing and the transrectal ultrasound-guided systematic six-sextant biopsy examination system, can improve the incidence of earlier stage PCa, can change the treatment situation of clinic which can only diagnose the late stage cancer, so that the patients' survival rate can be improved and live a happy and healthy life.

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