

Abstract

Introduction & Objectives: The open-access questionnaire RiskCheck Bladder Cancer (RCBC) was proven in daily routine work from German urologists organized in the health services research foundation IQUO on asymptomatic patients to identify BC risk exposure and its relation to detectable tumors.

Material & Methods: The RCBC questionnaire checked asymptomatic patients for their BC risk exposure in relation to personal-, smoking-, occupation- and medical induced risk. This resulted in a risk stratification with low- intermediate- and high risk. The intermediate and high risk subjects were checked for tumor presence by routine diagnostics. IBM-SPSS 22 was used for descriptive statistics and effectiveness was proven by classification tree analysis and cross-table analysis with Chi-square test, significance $\alpha < 0.05$.

Results: Out of 359 checked asymptomatic persons 311 (86.6%) were negative for tumor and 48 (13.4%) had a detectable tumor. Male to female was 332 to 27. Smoking was the most dominant risk factor. Non-smoker 52.4%, former smoker 26%, active smoker 21.6%, range of consumed cigarettes 0 to 755,600, consumption classes: <20,000 5.2%, 20,000 to 100,000 27.9%, 100.000 to 300,000 45.4% and > 300,000 21.6%. According to the ASCO guideline 13.6% were candidates for lung cancer screening based on their epidemiology and smoking behavior. The risk classification showed 62.4% low-risk, 17.3% intermediate-risk and 20.3% high-risk. The RCBC risk assessment showed a significant relation between the exposed risk factors and the detectable bladder cancers ($p < 0.01$). The classification tree analysis identified age, gender, type of smoking and live time consumption (above 219,000 cigarettes) as relevant factors. Sensitivity 56.3%, specificity 65.3%, NPV 90.6%, PPV 20.0%, false positive rate 43.8%, false negative rate 34.7%, accuracy 64.1%. Compared to the common incidence (35/100,000) this is an increase in effectiveness of 214.8 in the risk based screened population.

Conclusions: Preventive medical care becomes effective because RCBC is able to condense a population with focusing investigations on people living under risk. Via the secure VPN based questionnaire handling the IQUO can demonstrate that this tool can work in the hands of urologists. A reasonable preventive care by a yearly recall control in urological offices for the risk population (32.3%) can be organized. In consequence the assessment is work effective, aim achieving and in result cost effective. The questionnaire RCBC integrates evidence based bladder cancer inductors, is easy in use and as a open-access tool available in 10 languages via internet to all medical services. www.riskcheck-bladder-cancer.info. Furthermore RCBC is transferred to the iOS platform as RCBC2 including bladder- and lung cancer screening and available as an iPad APP.

Methods

- The Open-Access Tool was transferred to a VPN-secure web-based portal of the IQUO restricted to members.
- Characterization of the study population by descriptive statistics
- Check for predictive power of the questionnaire
- Classification tree analysis for BC associated risk-factors
- Calculation of improvement of risk-adapted-versus mass-screening

Work-Flow

- Assessment with questionnaire
- People with intermediate- or high risk were checked for BC symptoms
- Non invasive urine based diagnostics
- Invasive diagnostics (cystoscopy) for all symptomatic and risk positive people
- Documentation of detected tumors

Study population

598 interviewed people over 3 years
361 asymptomatic people in respect to BC
Male to female 334 to 27

Smoking characteristics

Positive in the cohort 47.6%
Consumption in numbers 0 to 766,500 cig.
Consumption in time 0 to 65 years
Non-smoker 52.4%
Becoming non-smoker 26.0%
Active smoker 21.6%
Lung cancer screening (+) 13.9%

Classification

Minimal smoker below 20,000 5.2%
Routine smoker 20,000 to 100,000 27.9%
Heavy smoker 100,000 to 300,000 45.4%
Extreme smoker above 300,000 21.5%

Quality results

Low risk 62,4%
Intermediate risk 17,3%
High risk 20,2%

Cross-table		Tumor Observed		
		Yes	no	sum
Predicted by RCBC	yes	27	108	135
	no	21	203	224
	sum	48	311	359

Sensitivity 56,3 % Accuracy 64,1 %
Specificity 65,3 % False negative 34,7 %
NPV 90,6 % False positive 43,8 %
PPV 20,0 %

Analysis

Smoking is the most dominant inductor for BC

Factors in priority

- Age
- Gender
- Type of smoker
- Consumption: >30 Pack Years (219,000 cig.)

Take home message

Preventive medical-care with RiskCheck Bladder Cancer® is

- **Work-effective**
- **cost-effective**
- **aim achieving**

Increase in effectiveness

risk-screening versus mass-screening

- **214.8 times**

Future perspectives

Identification of risk factors enables urologists to initiate

- Preventive care in daily routine
 - for bladder cancer
 - for lung cancer
- Early diagnosis with stage shift
- Primary prevention with smoking cessation

The Tool is transferred to iPad and available in German and English

Name in the App-Store: **RCBC²**

