International Journal of Psychosocial Rehabilitation, Vol. 23, Issue 06,
2019 ISSN: 1475-7192

Lung Cancer: A Review

[1]Dr. Soumya Surath Panda, [2]Dr. Saroj Prasad Panda

Abstract--- *CT has been used recently in lung cancer mass screening. Small cancers have been identified, but these lesions do not completely recognize the growth properties of the lesions. In the three-year mass CT screening program, researchers found 82 primary cancers, 61 of which were studied in present study. The volume doubling time has been determined on the basis of the exponential model using successive yearly CT images. Both cases of high resolution CT (HRCT) were also examined in the hospital. Lesions were classified into three HRCT-based types: type GS (n519), ground glass opacity (GGO); focal GGO with a solid central component; type G (n519) and solid nodule. The standard chest X-were not found in 18 (95 percent) lesions of type G, 18 (95 percent) of type GS and 7 (30 percent) of type S. For type G, type GS and type S, the maximum tumor size was 10, 11 mm and 16 mm, respectively. Adenocarcinomas were the majority of (80%) tumors; 78% were GGO (GS and type G). The mean value of VDT for type G, GS, and type S was 813 days, 457 days and 149 days; these are somewhat far apart from each other (p.0.05). Our findings suggest that an annual CT mass screening for 3 consecutive years resulted in the recognition of several adenocarcinomas, not apparent in chestx-rays that are slowly increasing.*

Keywords--- *Mass Screening, Primary Lung Cancer, Radiograph, Tumor.*

I. INTRODUCTION

In order to enhance prognosis, early diagnosis of primary lung cancer is essential. Chest radiography is limited in the effectiveness of identification of minor lung cancers. Spiral CT has recently been used in lung cancer mass screening [1±3]. In CT the chest X-ray is strongly contrasting and thus offers a greater chance of lung lesions identification[1], [2]. In such screening systems, several small lung cancers were found early on, but most were noticeable with conventional chest radiography[3], [4]. Studies have found that lymph node metastases are associated with 21% of peripheral lung cancers with a diameter of 20 mm. The essential dimensions of lung lesions found by mass screening with positive prognosis due to operational resection have not yet been determined[5], [6]. In order to detect a lesion smaller than a threshold for CT mass screening, the identification limit and the rate of growth of these nodules have to be identified. The tumor volume doubling time (VDT) has been adopted as a criterion for the prediction tests in most cases, accompanied last year by the use of regular chest radiographs in lung cancer research programs. They identified a different prognostic factor for lung cancers VDT. Therefore, long VDT lung cancer is associated with enhanced prognosis. The aim of this research was to determine the features of growth of CT mass screening lung cancer and to compare these tumors with standard chest radiography.

Department of Medical, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, soumyasurathpanda@soa.ac.in, sppanda@soa.ac.in

Received: September 2019 | Revised: October 2019 | Accepted: November 2019

I.I. Materials and Methods

Throughout May 1996 and December 1998, researchers performed a nationwide screening CT system for lung cancer. In 1996 there were 6431, in 1997 there were 5984 and 1998 there were 5567 screenings. 2119 have been screened twice and 3963 have been screened 3 times[7], [8]. People were free from symptoms and were 19±94 years of age. Mass screening CT was replicated with the same individual each year in general. Among 80 participants, 82 primary lung cancers, two participants with double cancers were found by researcher. Histopathology revealed the malignant essence of a tumor. In this report, 61 of the 82 cancers have been analyzed in depth. There were 38 men and 23 women aged 33±89 (mean age: 65). For the following factors, 21 cancers were then excluded: In the remaining 8 lesions during the two studies, a variety of different scans were found in two different levels: CT only once in three lesions, four cancer hilar lesions that could not be differentiated from atelectasis, lymph node or the hilar vessels; six lesions (adenocarcinoma) could not be accurately determined because of agitation or hardening of the artefact; In the other eight lesions during the two examinations two different scanning levels were detected. 39 nodules were observed in the second or third screening programs among the tumors included in this study.

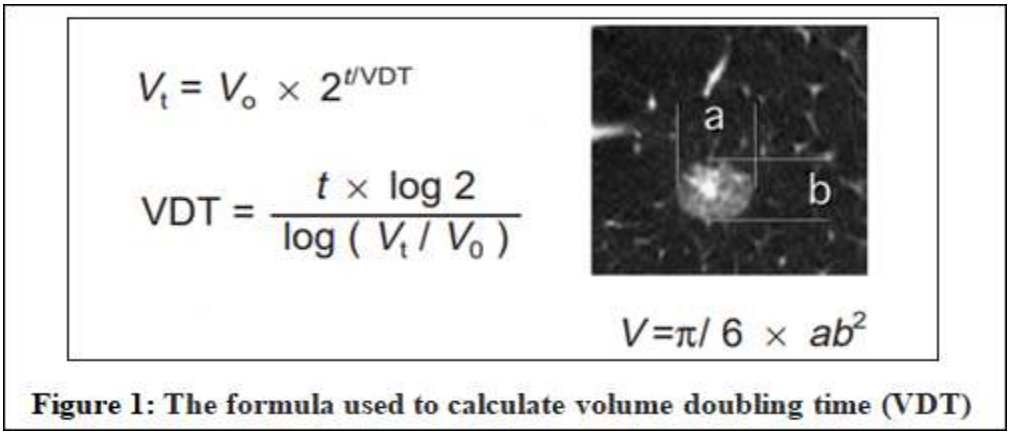

Figure 1: The formula used to calculate volume doubling time (VDT)

The previous screening images of CT were analyzed and retrospectively searched by three chest radiologists (MH, S T, and YM). If not only the previous CT picture but the CT picture is previously established, the maximum and perpendicular value of the injury was determined by consensus. 12 screening lesions were also tested at the institution with high resolution CT (HRCT) as they were indeterminate. With two HRCT follow-scans and 6 months afterwards, the time of a forward estimation was 3 months for a given nodule. Another justification for carrying out the second CT was pre-operative survey[9], [10]. The same approach mentioned above measured lesion. When more than two CT scans could be measured, the original and the last measurements were used for the accurate VDT calculation. The average time between two VDT screening tests was 458 days in retrospective analysis (range 159±980 days) and 140 days in prospective analysis (range 28±566 days) between two CT studies. Tumor VDT was estimated using the equation based on an exponential growth model's modulated Schwartz formula. In 14 of the 61 tumors on successive screening CTs or HRCT no major modifications in tumor size have been observed.

Received: September 2019 | Revised: October 2019 | Accepted: November 2019

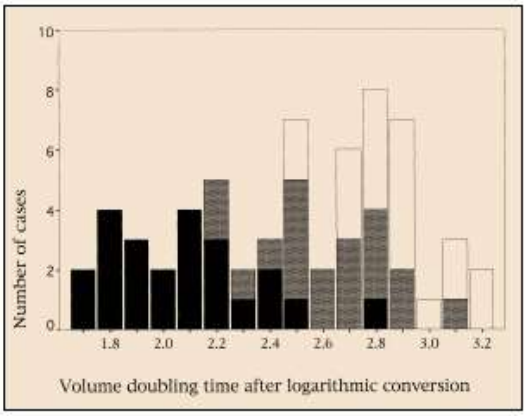

Figure 2: Distribution of volume doubling time (VDT) after logarithmic conversion. Data also show the distribution of VDT for each high resolution CT type: %, type G, ground glass opacity (GGO), type GS, GGO with a solid central component, type S and solid nodule.

In contrast with the original maximum dimension the total detectable tumour growth was one pixel. VDT has been measured with the proportions assumed. Chest CT mass scanning was performed by means of a mobile spiral unit. Parameters of scanning are 120 kV, 50 mA or 25 mA, 10-mm collimating, 2-and2-scan spiral pitch. CT images with a 300 mm and matrix of 51206512 (pixel size 0.6 mm) were created. HRCT scans have been conducted in our hospital using the GE Medical Systems, WI Hi Speed Advantage CT scanner. The scan parameters were 120 kV peak, 1 mm or 3 mm, 200 mA, 1 and 1 s scanning period. A bones algorithm with a size of 200 mm and a matrix of 5126512 (size of 0.4 mm pixel), was used to reconstruct HRCT images. CT images were analyzed by radiologists using the lung region of normal value (level 2700 HU; window width 1000 HU). The same three radiologists analyzed the HRCT images and decided on the treatment of lung. In three classes, the pulmonary lesions were classified based on results of HRCT: type G, GS, GGO, Focal GGO, with a big central portion, and Type S, stable GGO nodule, without GGO. At the time of the HRCT a chest X-ray was taken. Three additional radiologists of the chest (SS, FL, ZY), oblivious to the CT results, viewed the x-ray chest. Surgical resection (59 cases) or transbronchial biopsy (2 cases) have been used to collect pathologic specimens, which have been stained with eosin and hematoxyl. Three pathologists studied the samples by light microscopy and decided on histopathological diagnosis. They also recorded growth patterns of development, i.e. development by replacing alveolar cells (lepid growth) or by expansion and degradation (lepidic growth). Pathological (59 cases) or pathological (2 cases) have been determined in TNM levels. If the VDT distribution is seen, data have been converted into a logarithm that corresponds to the previous report. The data are presented as a standard mean deviation (SD). The SPSS program was used for statistical analysis. For the statistical importance, the differences between groups have been examined using the t-test (for pair comparisons) of students or Bonferroni (for several comparisons). A p-value less than 0.05 indicated a discrepancy between statistically important.

Received: September 2019 | Revised: October 2019 | Accepted: November 2019

I.II. Results

The smallest and longest VDT tumor was 52 days and 1733 days. The VDT median was 452,381 days (342 days for the mean geometrical). Figure 2 demonstrates the dispensing of VDT after logarithmic conversion. The clinic pathology of these types is outlined in Table 1. The condition has been categorized according to HRCT type. Adenocarcinomas were 49 (80%), squamous cell carcinomas were 8 (13%) and low (7%) cell carcinomas were 4 (80%). In the result of screening CT, the geometrical mean of the vertical and perpendicular measurements of the injury was 4±32.3 mm (11.4 mm median). In the three HRCT types, the mean measurements were 9.9 mm, 11.4 mm and 15.6 mm, respectively for type G, type GS and type S. The latter was considerably larger than the G and the GS (p, 0.05). Tumor VDTs are illustrated in Table 2 according to different clinic pathological parameters.

Table 1: Number of cases according to high resolution CT type

Factor	Type G	Type GS	Type S
Gender			
Male	8	8	22
Female	11	11	1
Smoking history			
⩽20 pack-year	16	13	2
>20 pack-year	3	6	21
Pathological type			
WD adenocarcinoma	19	14	5
MD adenocarcinoma	0	5	2
PD adenocarcinoma	0	0	4
Squamous cell carcinoma	0	0	8
Small cell carcinoma	0	0	4
Growth pattern			
Lepidic growth pattern	19	19	2
Hilic growth pattern	0	0	21
Size (mm)			
Range	4–25	5–20	9–32
Mean±SD	9.9±4.8	11.4±4.4	15.6±5.6
Location			
Periphery	18	18	21
Hilar or perihilar	1	1	2
Visibility on chest radiograph			
Negative	18	18	7
Positive	1	1	16
TNM stage			
Stage I	19	18	17
Stage II	0	1	2
Stage III	0	0	3
Stage IV	0	0	1

The mean VDT was significantly smaller for smokers in contrast with non-smokers (p50.001). Furthermore, the VDT tumors with invisible nodules on the chest X-rays were significantly longer than those on the visible nodules on the radiograph of chest (p50.012). Based on the histological form of the tumor, a small cell carcinoma and squamous cell carcinoma were found to be the shorter VDT, whereas the longer was adenocarcinoma (p.0.05). The VDT tumor was the shortest tumor in HRCT, and the longest type VDT in GGO focal (Table 2) was the longest tumor in HRCT. In the result, no tumor size or gender in the tumor growth levels was calculated (Table 2).

Received: September 2019 | Revised: October 2019 | Accepted: November 2019

Table 2: Mean volume doubling time (VDT) based on several clinics pathological factors

Parameter	*n*	VDT[a]
Gender		
Male	38	387±409
Female	23	559±308
Size (mm)		
<10	22	536±283
10–15	23	466±481
16–20	9	325±353
>20	7	299±273
Smoking history		
Smoker	30	292±297
Non-smoker	31	607±392
Visibility on chest radiograph		
Negative	43	536±345
Positive	18	250±395
Pathological type		
Adenocarcinoma	49	533±381
Squamous cell carcinoma	8	129±97
Small cell carcinoma	4	97±46
High resolution CT type[b]		
Type G	19	813±375
Type GS	19	457±260
Type S	23	149±125

I.III. Discussion

This analysis varies considerably in VDT distribution from the previous study. In our sample, the mean VDT was 452 days longer than the sample above (163.7 days). This research involved several long-term VDT tumors, and perhaps this disparity is due to the screening process (e.g. chest radiograph). There was also a high proportion (80 percent) of adenocarcinomas in this study. In this research, nearly all tumors with long VDTs were G-class or GS class. 31 of these were well defined (90%) adenocarcinomas, 18 (58%) of the adenocarcinomas were type G and 11 (35%) were type GS and 28 (90%) were not visible in the chest radiography. VDTs were higher than the geometrical mean of 342 days. On the basis of such examination, a high proportion of adenocarcinomas, which are not visible during radiographyf chest is found by mass screening of CT and the longest VDT cancers. In a thorough analysis, researchers noted that more than 450 days of VDT for most benign pulmonary nodules, while malignant lesions were typically fewer than 400 days for VDTs. The lack of development in a lesion over a span of 2 years suggests a venerable dictum. However, the researcher raised doubts about this dictum in a recent report. They concluded that two-year stability was not necessarily healthy as malignancy with a long VDT may also mean. New research of VDT for adenocarcinoma published more than 2 years to support their claims. The mean VDT was over 450 days in the sample and 27 adenocarcinomas with VDT over 450 days identified; twelve of which had VDT over 730 days (2 years). These gradually developing tumors were usually G or GS and in the past they were known as benign lesions. Adenocarcinoma (BAC) occurs on HRCT image as focal GGO, in particular in diffuse cases of bronchioloalveolar carcinoma. These tumors are formed by substituting alveolar lining cells, which is identical to the forms G and GS, which correlate with histology [12±14]. Six forms of adenocarcinomas were identified and their clinicopathological properties and prognosis stated by researcher. Localized BACs without active broblastic proliferation are called peripheral adenocarcinoma in situ, whereas localized BACs with active broblastic proliferative foci are known as

Received: September 2019 | Revised: October 2019 | Accepted: November 2019

advanced phases of the former sort. Because of their resolution, it could not always be possible to establish a one-to - one link between the HRCT form and Noguchi classfication. Nonetheless, most G lesions match the former and most GS lesions follow the latter. The VDT with lesions of type G includes in situ carcinoma and the GS type suggests a more advanced type G form. In this respect, scientists also confirmed that the rate of growth in lung cancer is linked to uoride-18 uorodeoxyglucose (FDG) in positron emission tomography, which they also proposed could be have use to diagnose malignancy. In a more recent study, however, researchers have found that localized BAC may display a lower absorption of FDG and a false negativity.

II. CONCLUSION

Researcher analysis also involved a distortion of the period. The current and the researcher's sample is essentially focused on annual mass screening. A variety of cancers in the participants were identified based on the symptoms during the CT screening phase. However, these allegations have not been prosecuted. Researchers have identified as many cases as possible. In the analysis, there was an interval of 3±12 months between two VDT estimation tests. This was less than the time scale of the analysis. The longer mean VDT for each pathological form may justify this longer bias during the research compared to the previous analysis. Hilar tumours, composed mostly of tiny cells and squamous cell carcinomas, exhibit greater development than peripheral adenocarcinomas and may contribute to quicker clinical symptoms. This bias would also cause hilar tumors in our sample to be less represented with the exception of missed cases. Random annual checks on the same population with CT and missing cancer testing would make a clearer estimate of the exact occurrence of lung cancer in the population.

REFERENCES

[1] P. C. Registry, “Global Cancer Observatory,” Malaysia Cancer Stat., 2019.
[2] F. Nasim, B. F. Sabath, and G. A. Eapen, “Lung Cancer,” Medical Clinics of North America. 2019.
[3] I. Monnet, “Small cell lung cancer,” Rev. des Mal. Respir. Actual., 2018.
[4] The Global Cancer Observatory, “Cancer fact sheet,” World Heal. Organ., 2019.
[5] Canadian Cancer Statistics Advisory Committee, Canadian Cancer Statistics 2019. 2019.
[6] P. M. de Groot, C. C. Wu, B. W. Carter, and R. F. Munden, “The epidemiology of lung cancer,” Translational Lung Cancer Research. 2018.
[7] L. A. Torre, F. Bray, R. L. Siegel, J. Ferlay, J. Lortet-Tieulent, and A. Jemal, “Global cancer statistics, 2012,” CA. Cancer J. Clin., 2015.
[8] L. A. Torre, R. L. Siegel, and A. Jemal, “Lung cancer statistics,” Adv. Exp. Med. Biol., 2016.
[9] C. S. Dela Cruz, L. T., and R. A. Matthay, “Lung Cancer: Epidemiology, Etiology, and Prevention,” Clinics in Chest Medicine. Tanoue 2011.
[10] D. R. Aberle et al., “Reduced lung-cancer mortality with low-dose computed tomographic screening,” N. Engl. J. Med., 2011.

Received: September 2019 | Revised: October 2019 | Accepted: November 2019