CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.3692650

Available online at: http://www.iajps.com *Research Article*

STUDY TO KNOW THE ASSOCIATION BETWEEN PULMONARY FIBROSIS AND LIVER CIRRHOSIS

[1]Dr Mohammad Atiq Ur Rehman, [2]Dr Aftab Rabbani, [3]Dr Imran Joher

[1]MBBS MRCP, Assistant Professor, Sharif Medical and Dental College Lahore

[2]MBBS MRCP, Associate Professor, Sharif Medical and Dental College Lahore

[3]MRCP UK, Assistant Professor Medicine, Sharif Medical City Lahore

Article Received: December 2019 **Accepted:** January 2020 **Published:** February 2020

Abstract:

Objective: *To understand the relationship between cirrhosis and pulmonary fibrosis in different groups of cirrhosis according to the child's classification.*

Study design: *A descriptive study.*

Place and duration: *In the Medicine Unit of Sharif Medical City Lahore for one year duration from September 2018 to September 2019.*

Results: *The incidence of hepatitis C is higher than for hepatitis B. The cirrhosis causes are the similar as for fibrosis. In countries which are fully developed, most cases are the result of chronic hepatitis C or chronic alcohol abuse. In some parts of Asia and Africa, cirrhosis is often a magnitude of chronic hepatitis B. Pulmonary fibrosis is an important component of many interstitial lung diseases or diffuse parenchymal disease. The study included 60 patients aged 20–75 ± SD 36.67 ± 8.35. 56% were male and 44% male-female ratio was 1.27: 1. In the Child group A; there were 22 (44%) patients with mean ± SD 1.52 ± 0.29, 9 (18%) patients in group B with mean 1.02±0.62±SD and Child group C was 18(38%) correspondingly with 1.31±0.21 mean ±SD and missing patient was only one. In 9(18%) patients had Child's class A, Child's 16(32%) with class B and 22(44%) patients with Child's class C, correspondingly The child class was assigned to each patient according to two clinical criteria and three laboratory criteria defined in the CTP system. According to clinical and laboratory criteria, 22 of 50 patients (44%) had pulmonary fibrosis in cirrhosis. There were twenty-six (52%) who were absent and only 2 (4%) were missing due to unemployment. Ultrasonography of portal hypertension shows, i.e. 60 (100%) reduction of the hepatic span and portal vein widening was noted in 10 (20%), while absent in 6(12%) of patients, splenomegaly was identified in 9(18%) patients and absent in 5(10%) and ascites was present in 13(26%) patients and absent in 4(8%). Pulmonary fibrosis and liver cirrhosis were statistical correlation tests, the difference was significant (p <0.05).*

Conclusion: *A noteworthy association between pulmonary fibrosis and liver cirrhosis was noted and with Child's class advancement, occurrence of pulmonary fibrosis rises.*

Key words: *liver cirrhosis, pulmonary fibrosis and childhood classification*

Corresponding author:

Dr Mohammad Atiq Ur Rehman,

MBBS MRCP, Assistant Professor,

Sharif Medical and Dental College Lahore

dr.atiqurrehman98@yahoo.com +92-331-4908440

QR code

Please cite this article in press Mohammad Atiq Ur Rehman et al, ***Study To Know The Association Between Pulmonary Fibrosis And Liver Cirrhosis.,*** *Indo Am. J. P. Sci, 2020; 07(02).*

INTRODUCTION:

Pulmonary fibrosis is an important constituent of many parenchymal or interstitial lung diseases. T (CD4 +) cells specify in the making of soluble factors (cytokines) that can move profibrotically (IL-13, IL-4, TGF-21)[1, 2]. However, this functional experience is incorrect; CD8 + T cells can also aid as an important source of CD4 + 2 and cytokines[3]. In the US; the major causes of chronic liver disease is Hepatitis C virus (HCV).It represents approximately 15% of acute viral hepatitis, chronic hepatitis in 60-70% of cases and 1.7% of the US population or about 4.2 million have liver cirrhosis in America, have anti-HCV antibody, signifying previous or ongoing infection with the virus[4]. It grounds between 11,000 and 13,000 deaths per year in the US. Cirrhosis is one of the foremost reasons of death. All viral hepatitis is an important cause of liver cirrhosis in Pakistan. Hepatitis C is more common than hepatitis B. The cirrhosis causes are the identical as of fibrosis[5]. Maximum cases are the result of chronic hepatitis C or chronic alcohol abuse. In some parts of Africa and Asia, cirrhosis is frequently a consequence of hepatitis B in chronic phase. Cirrhosis (cryptogenic cirrhosis) of unidentified etiology is becoming less common because it has been diagnosed in many people with certain causes (e.g. chronic hepatitis C, fatty hepatitis). Biliary damage can also cause cirrhosis, such as primary biliary cirrhosis and mechanical bile obstruction[6'7]. These include hyperplastic expansion of type II4 cells after damage and loss of type I follicular cells; variable chronic infiltration of inflammatory cells; Induction of pro-inflammatory cytokines such as tumor necrosis factor TNF-α and TNF-ß and interleukin (IL) -8[8].
Idiopathic pulmonary fibrosis is an advanced interstitial lung disease that seriously affects lung function. Idiopathic pulmonary fibrosis is probably the result of an anomalous response of healing to alveolar surface damage, and the progress of the disease is based on the progressive accumulation of fibroblasts and collagen that removes normal tissue of the lung[9]. The IPF patient's median survival time is 3 years after diagnosis and there is still no effective treatment.

METHODOLOGY:

This descriptive study was held in the Medicine Unit of Sharif Medical City Lahore for one year duration from September 2018 to September 2019.
. The medical examination was carried out over a period of six months. 60 patients were included in the study. All patients over the age of 20 who went to an outpatient clinic and admitted in medicine department. Patients' age, gender and physical characteristics were similar, and the incidence of pulmonary fibrosis and child's classes was also observed.

Data collection procedure: patients were clinically evaluated for ascites, jaundice and hepatic encephalopathy. Laboratory tests were performed to diagnose the child's class, such as serum albumin, bilirubin, and prothrombin time. Chest x-ray and ultrasound were performed for coarse echotexture, reduced liver span, portal vein enlargement, spleen size in cm and midline of the clavicle for the presence or absence of ascites in all patients. All patients underwent lung function tests to detect a restrictive pattern of lung diseases. All patients underwent an HRCT test to detect the presence or absence of pulmonary fibrosis. All information collected from the form was entered in the SPSS 20 version and analyzed using a statistical program. Descriptive statistics were calculated. The quantitative variables like child group in the mean form, age and standard deviation. The qualitative variables like gender, ultrasound findings and pulmonary fibrosis i.e. portal vein dilation, ascites and splenomegaly were accessible as percentages and frequencies in tabulated forms. The level of significance was assumed as $p < 0.05$.

RESULTS:

60 patients of both sexes were included in this study. The 36.67 ± 8.35 years was the mean age. 11 out of 60 patients (18.3%) in the 20-35 age group, 24 (40%) in the 36-51 age group, 17(28.3) in the 52-67 age group, and only 8 (13.3%) in patients above age of 67 years. The difference was not statistically significant. 55% were male and 45% were female and M: F ratio was 1.27: 1 (Table 1).

Table 1: Frequency distribution of demographic variables of patients (n=60)

	Frequency	**%age**
Male	33	55
Female	27	45
Age range (yrs)		
20 –35	11	18.3
36 – 51	24	40.0
52 – 67	17	28.3
>67	8	13.3

Table 2 shows that 60 patients had lung function tests. 70 (63.3%) had limited and 15 (25%) patients with obstruction and 7 (11.7%) had interstitial lung disease such as IPF.

Table 2: Frequency of pulmonary function test

Pulmonary test	Frequency	%age
Restrictive	38	63.3
Obstructive	15	25.0
Missing(IPF)	7	11.7

Child group A had 25(41.7%) patients with mean± SD 1.53±0.39, group B 12(20%) patients with mean ±SD 1.03±0.6 and Child group C was 21 (35%) correspondingly with mean± SD 1.32±0.22 and only 2(3.33%) patient was missing. Table 3 also shows the Child's class A had 10(16.7%) patients, Child's class B 19(31.7%) and Child's class C had 25(41.7%) patients respectively. Child's class was assigned to each patient based on two clinical and three laboratory criteria as defined in CTP system.

Table 3: Distribution of Child's group and Child's Classes of patients

Child Group	Child Group			Child's Class	
	Frequency	%age	Mean± SD	Frequency	%age
A	25	41.7	1.53± 0.39	10	16.7
B	12	20.0	1.03± 0.63	19	31.7
C	21	35.0	1.32± 0.53	25	41.7
Missing	2	3.3		6	10.0

There were 29 (48.3%) have absent pulmonary fibrosis cirrhosis and only 2 (3.3%) were missing due to incomplete work (Table 4). Ultrasonography of portal hypertension shows, i.e. 60 (100%) reduction of the hepatic span and portal vein widening was noted in 12 (20%), while absent in 5(8.3%) of patients, splenomegaly was identified in 10(16.7%) patients and absent in 7(11.7%) and ascites was present in 14(23.3%) patients and absent in 8(13.3%).

Table 4: Frequency of pulmonary fibrosis cirrhosis

Pulmonary test	Frequency	%age
Present	25	41.7
Absent	29	48.3
Missing	6	10.0

Pulmonary fibrosis and liver cirrhosis were statistical correlation tests, the difference was significant ($p < 0.05$). (Table 5).

Table 5: Ultrasonography findings of portal hypertension features

Features	Present	%age	Absent	%age
Splenomegaly	10	16.7	7	11.7
Portal vein dilation	12	20.0	5	8.3
Ascites	14	23.3	8	13.3
Reduced liver span	60	100	0	

Liver biopsy is the gold standard in the diagnosis of liver cirrhosis. Most patients with cirrhosis have an irregular coagulation and thrombocytopenia profile. Biopsy is contraindicated in most of these patients, so we have to rely on clinical evaluation and laboratory and radiological tests to detect cirrhosis.

Idiopathic pulmonary fibrosis is also a progressive fatal disease. Given the above facts, it is thought that cytokines, which play a role in stimulating liver cells to produce collagen, reach the lungs through the bloodstream, which may encourage lung fibrinogenesis cells to produce collagen as in the liver. This will help to treat IPF with drugs and used to treat cirrhosis. Therefore, we will show this relationship through tissue and cell cultures in future research. In addition, early detection and treatment of IPF in a population of cirrhosis will affect survival.

DISCUSSION:

In the study by Puoti, the average age was 32.13 ± SD 36.67 ± 8.35 years, men 33(55%) and women 27 (45%) men / women ratio 1.27: 1 liver cirrhosis and pulmonary fibrosis can be compared with other studies[10'11]. A study by the European Society for Respiratory Society of the American Thoracic Society (ATS) in the United States found that men with IPF are more numerous than women[12]. Watters, another study by men and women, also had the same impact. In this study, the incidence of pulmonary fibrosis was demonstrated in patients with cirrhosis compared with the frequency in the general population. The risk of developing

pulmonary fibrosis increases with the number of occupational exposures for years. Powders containing steel, brass, lead and pine wood are more specifically associated with the development of pulmonary fibrosis. Unfortunately, most studies attempting to identify environmental threats to the development of pulmonary fibrosis are limited depending on clinical diagnosis, without screening or HRCT verification[13]. The frequency of interstitial lung disease in chronic liver disease of various etiologies is from 13 to 60% in published literature[14]. Current research shows that a higher incidence of IPF is due to a higher incidence of liver cirrhosis. Mediators caused chronic inflammation, which played an important role in the accumulation of collagen fibers. Mediators also reach the lungs through circulation, so this factor causes collagen to accumulate in the lungs, which causes fibrosis. Based on the results of lung function tests, it has been observed that patients with obstructive PFTs may also have fibrosis, so PFT is not a reliable indicator of interstitial lung disease in patients with cirrhosis[15].

REFERENCES:

1. O'Dwyer, D.N., Ashley, S.L., Gurczynski, S.J., Xia, M., Wilke, C., Falkowski, N.R., Norman, K.C., Arnold, K.B., Huffnagle, G.B., Salisbury, M.L. and Han, M.K., 2019. Lung microbiota contribute to pulmonary inflammation and disease progression in pulmonary fibrosis. *American journal of respiratory and critical care medicine*, *199*(9), pp.1127-1138.
2. Cocconcelli, E., Balestro, E., Biondini, D., Barbiero, G., Polverosi, R., Calabrese, F., Pezzuto, F., Lacedonia, D., Rea, F., Schiavon, M. and Bazzan, E., 2019. High-resolution computed tomography (hrct) reflects disease progression in patients with idiopathic pulmonary fibrosis (IPF): relationship with lung pathology. *Journal of clinical medicine*, *8*(3), p.399.
3. Planas-Cerezales, L., Arias-Salgado, E.G., Buendia-Roldán, I., Montes-Worboys, A., López, C.E., Vicens-Zygmunt, V., Hernaiz, P.L., Sanuy, R.L., Leiro-Fernandez, V., Vilarnau, E.B. and Llinás, E.S., 2019. Predictive factors and prognostic effect of telomere shortening in pulmonary fibrosis. *Respirology*, *24*(2), pp.146-153.
4. Méthot, D.B., Leblanc, É. and Lacasse, Y., 2019. Meta-analysis of gastroesophageal reflux disease and idiopathic pulmonary fibrosis. *Chest*, *155*(1), pp.33-43.
5. van Batenburg, A.A., Kazemier, K.M., van Oosterhout, M.F., van der Vis, J.J., van Es, H.W., Grutters, J.C., Goldschmeding, R. and van Moorsel, C.H., 2020. From organ to cell: Multi-level telomere length assessment in patients with idiopathic pulmonary fibrosis. *PLoS One*, *15*(1), p.e0226785.
6. Kropski, J.A. and Blackwell, T.S., 2019. Progress in understanding and treating idiopathic pulmonary fibrosis. *Annual review of medicine*, *70*, pp.211-224.
7. Iwasawa, T., Okudela, K., Takemura, T., Fukuda, T., Matsushita, S., Baba, T., Ogura, T., Tajiri, M. and Yoshizawa, A., 2019. Computer-aided quantification of pulmonary fibrosis in patients with lung cancer: relationship to disease-free survival. *Radiology*, *292*(2), pp.489-498.
8. Zhang, J., Wang, D., Wang, L., Wang, S., Roden, A.C., Zhao, H., Li, X., Prakash, Y.S., Matteson, E.L., Tschumperlin, D.J. and Vassallo, R., 2019. Profibrotic effect of IL-17A and elevated IL-17RA in idiopathic pulmonary fibrosis and rheumatoid arthritis-associated lung disease support a direct role for IL-17A/IL-17RA in human fibrotic interstitial lung disease. *American Journal of Physiology-Lung Cellular and Molecular Physiology*.
9. Zhou, Y., Chen, L., Sun, G., Li, Y. and Huang, R., 2019. Alterations in the gut microbiota of patients with silica-induced pulmonary fibrosis. *Journal of Occupational Medicine and Toxicology*, *14*(1), p.5.
10. Benyelles, M., O'Donohue, M.F., Kermasson, L., Lainey, E., Borie, R., Lagresle-Peyrou, C., Nunes, H., Cazelles, C., Fourrage, C., Ollivier, E. and Marcais, A., 2020. NHP2 deficiency impairs rRNA biogenesis and causes pulmonary fibrosis and Høyeraal-Hreidarsson syndrome. *Human Molecular Genetics*.
11. Hozumi, H., Hasegawa, H., Miyashita, K., Yasui, H., Suzuki, Y., Kono, M., Karayama, M., Furuhashi, K., Hashimoto, D., Enomoto, N. and Fujisawa, T., 2019. Efficacy of corticosteroid and intravenous cyclophosphamide in acute exacerbation of idiopathic pulmonary fibrosis: A propensity score-matched analysis. *Respirology*, *24*(8), pp.792-798.
12. Guler, S.A., Kwan, J.M., Leung, J.M., Khalil, N., Wilcox, P.G. and Ryerson, C.J., 2020. Functional ageing in fibrotic interstitial lung disease: the impact of frailty on adverse health outcomes. *European respiratory journal*, *55*(1).
13. Barnard, A., Moch, A. and Saab, S., 2019. Relationship between Telomere Maintenance and Liver Disease. *Gut and liver*, *13*(1), p.11.
14. Jaeger, V.K., Lebrecht, D., Nicholson, A.G., Wells, A., Bhayani, H., Gazdhar, A., Tamm, M., Venhoff, N., Geiser, T. and Walker, U.A., 2019. Mitochondrial DNA mutations and respiratory chain dysfunction in idiopathic and connective tissue disease-related lung fibrosis. *Scientific reports*, *9*(1), pp.1-8.

15. Ito, Y., Arita, M., Kumagai, S., Takei, R., Noyama, M., Tokioka, F., Nishimura, K., Koyama, T., Tachibana, H. and Ishida, T., 2019. Radiological fibrosis score is strongly associated with worse survival in rheumatoid arthritis-related interstitial lung disease. *Modern rheumatology*, *29*(1), pp.98-104.