ORIGINAL ARTICLE

Renal Histopathology In Heroin Involved Deaths (An Autopsy Study)

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ABSTRACT

Objectives: To study /evaluate the histopathological changes in kidneys of dead bodies of heroin addicts, so to assess their involvement as possible cause of death.

Study Design: A prospective, observational study.

Place & Duration: The work was completed in six months duration in the medicolegal departments of Abbasi Shaheed Hospital Karachi ,Jinnah Postgraduate Medical Center Karachi & Civil Hospital Karachi, and department of Pathology, Basic Medical Sciences Institute, JPMC Karachi.

Material & Methods: Renal specimens were obtained from 25 autopsies of heroin addict persons autopsied in various hospitals of Karachi. Chemical analysis of lungs & kidneys was done in chemical lab for the detection of Morphine. All renal specimens were microscopically examined with Hematoxylin-eosin, PAS, Congo red and Gomori (Methenamine silver trichrome).The stained slides were examined under microscope in the department of pathology, BMSI, JPMC, Karachi, All the findings were recorded on a proforma designed for the study and results were tabulated.

Result: Out of 25 cases 12(48%) showed the features consistent with Mesangio-proliferativeglomerulo-nephritis, 3(12%) Membrano-prolifative glomerulonephritis (MPGN), 3(12%) with Progressive focal segmental glomerulosclerosis (FSGN), 3(12%) Focal segmental glomerulosclerosis, 1 (4%) with chronic granulomatous inflammation (foreign body type), 1(4%) with diffuse glomerulosclerosis, 1 (4%) with Mesangial sclerosis and 1 (4%) showed vascular ectasia and congestion.

Conclusion: Heroin addiction is associated with several severe and occasionally fatal renal complications. Mesangio-proliferativeglomerulo-nephritis and Membrano-prolifative glomerulo-nephritis (MPGN) and progressive FSGN are most common pathological findings in the syndrome of (HAN) Heroin associated nephropathy.

Key Words: Renal histopathology, Autopsy, Heroin addicts

INTRODUCTION

Heroin abuse has been increasing steadily in Pakistan. Among the most commonly used drugs in terms of life time use & prevalence heroin stands second. Abuse of narcotic drugs especially heroin is the most serious consideration of all international organizations. Man has used drugs for recreational purpose as long as history itself. Arabic traders smoked opium in 3rd century BC. In the last 30 years, the number of peoples using recreational drugs appears to have increased[1]. According to CNN, Pakistan & Iran having the highest rate of heroin addiction.[2] According to National Drug Abuse Assessment Study of Pakistan 2000-01 prevalence among males in the age bracket of 15-45 years, there are 500,000 regular heroin users & drug injectors[3], and increased to 6.7million in 2006[4]. For most drugs type, abuse is not as common and pervasive among women as it is among the male population.[5]

Morphine was first isolated in 1806 from or chemically similar substances found in Papaver

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somniferrum, the opium puppy. One of the most important synthetic derivatives of morphine (opiod) is diacetyl morphine (heroin) was introduced in 1808 .Heroin was created to final safe type of morphine and was named "Heroisch" presumably due to drugs heroitic ability to mimic the effects of morphine without causing addiction. Use of a new type of Mexican Heroin called "Black tar " is increasing day by day which is 40 times more stronger & 10 times cheaper than pure heroin.[6] Heroin is a powerful opiate, a pain killer that produce euphoria and blissful apathy. It is known for leading addiction and difficult withdrawal symptoms Heroin has 1/2 life of 3 minutes, rapidly metabolized to morphine which is responsible for pharmacological actions. It can be sniffed (snorting), eaten, smoked (chasing the dragon), injected subcutaneously (skin popping) or injected intravenously (mainlining). It is often injected in combination with cocain (speed bathing).[7] According to WHO definition "Drug dependence is a state of psychic & physical dependence resulting from interactions between a living organism and drug characterized by behavioral & other responses that always include a compulsion to take the drug on continuous or periodical basis in order to experience its' psychological effects and sometimes to avoid the discomfort of its absence[8]. Variety of renal complications are reported. (1) Amyloidosis in subcutaneous heroin Abusers (skin popper amyloidosis), (2) Glomerular lesions, focal segmental glomerulosclerosis(FSGS), Membranous glomerulonephropathy (MGN), Membranoproliferative glomerulonephritis (MPGN), and minimal change disease (MCD) in intravenous abusers[9-11]. The association between heroin addicts and MPGN was first described by Kilcoyne et al in 1972.[12]

MATERIAL AND METHODS:

Specimens/kidneys were obtained from 25 autopsies of heroin addicts brought for post mortem examination at major Medico-Legal centers of Karachi including JPMC, Civil hospital and Abbasi Shaheed hospital. After external and internal examination of cavities kidneys were removed and preserved. Pieces of lungs & kidneys were taken & sent to chemical lab for the detection of Morphine. The only inclusion criterion was the detection of Morphine in the organs submitted for chemical analysis. Multiple sections (incomplete) of kidneys were taken & passed in 10% formalin solution for fixation of tissues. After fixation kidneys were re-examined grossly and sections taken from site of lesion including healthy margins and processed by routine paraffin embedding for microscopic examination. PAS (Periodic Acid Schiff), Congo red and GMS (Gomori Methanamine Silver trichrome) stains were also done beside routine H&E (haematoxylin and eosin).

RESULTS

Microscopic Examinations

Kidney: Out of 25 cases twelve showed features consistent with mesangioproliferative glomerulonephritis, three with membranoproliferative glomerulonephrits, three with progressive focal segmental glomerulonephritis with glomerulosclerosis, three with focal segmental glomerulosclerosis ,one with chronic granulomatous inflammation (foreign body type), one with diffuse glomerulosclerosis, one with Mesangial sclerosis and one showed vascular ectasia & congestion.

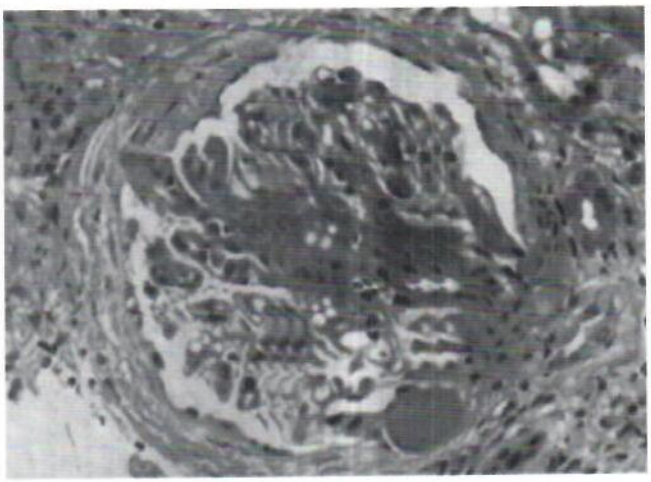

Fig-1: Photomicrograph shows high power view of renal tissue of a heroin addict with features of focal segmental glomerulosclerosis, fibrosis of Bowman's capsule & Hyalinization

Table-1: Kidney; (Diagnosis of 25 Selected Autopsis)

Diagnosis	No. of Cases	%
Mesangioproliferative glomerulonephritis	12	48
Membranoproliferative glomerulonephritis	3	12
Progressive focal segmental glomerulonephritis with glomerulosclerosis	3	12
Focal segmental glomerulosclerosis	3	12
Chronic granulomatous inflammation (foreign body type)	1	4
Diffuse glomerulosclerosis	1	4
Mesangial sclerosis	1	4
Vascular ectasia & congestion	1	4

DISCUSSION

This study proves that price of heroin addiction is clearly more than the cost of drug. Heroin addiction gives rise to two types of renal lesions most commonly seen.

1-Amyloidosis[13]
2- Focal glomerulosclerosis[14]

Both of these induce nephrotic syndrome. Focal glomerulosclerosis resembles the idiopathic form of glomerulo-nephritis and has a tendency to end stage renal disease.[14]

The present study revealed 12(48%) cases of Mesangio-proliferativeglomerulo-nephritis, 3 (12%) Membrano-proliferative glomerulonephritis (MPGN), 3(12%) with Progressive focal segmental glomerulosclerosis (FSGN), 1 (4%) with chronic granulomatous inflammation (foreign body type), 1 (4%) with diffuse glomerulosclerosis, 1 (4%) with mesangial sclerosis and 1 (4%) showed vascular ectasia and congestion. In the 1970s and 1980s heroin associated nephropathy (HAN) was described, presenting as nephrotic syndrome & progressing end stage renal failure.[15] Progressive glomerulopathy leading to nephritic syndrome & renal insufficiency in heroin addicts was first described by Rao et al.[16] Renal biopsy data in HAN(heroin associated nephropathy) patients have consistently disclosed focal segmental glomerulosclerosis (FSGN) with deposition of IgM and C3 in areas of sclerosis[17]

Cunningham et al; examined the clinical & pathological findings of a group of intravenous heroin abusers who had evidence of renal disease. Focal glomarulosclerosis with segmental sclerosis observed in eleven patients. In eight specimens completely sclerosed glomeruli were present along with glomeruli exhibit an increase in mesangial matrix. In two specimens diffuse mesangial sclerosis was found.[18]

Treser et al; examined renal biopsy specimens of 21 addicts with renal disease. Thirteen patients with nephrotic syndrome & eight with other evidences of renal involvement. Out of thirteen patients with nephritic syndrome, one had minimal change disease, two had proliferative glomerulo-nephritic lesions and remaining two had mild to moderate mesangial increase. Positive immune staining for IgG was found in all patients studied.[19]

Rao et al; identified focal and segmental glomerulosclerosis that progressed to global sclerosis as the lesion characteristic of parentral drug abuse.[20] The characteristic glomular lesion in intravenous drug abusers has been confirmed by numerous other investigators (Matalon,1974[21]; Grishman 1976[22]; Dubrow 1985[23]; Baldwin 1993[24]; McMaRice 2000[25] and Shane Darke[5].

Do Sameiro et al found that most frequent type of glomerular lesion was membrano proliferative glomerulonephritis (MPGN) associated with HCV infection[26]. Dettmeyer et al described 179 autopsies of European drug addicts; 61.7% had MPGN, but no case of FSGS was found[27].

Passarino et al has reported cases of interstitial nephritis (8%) more frequent in females & older patients carrying HIV infection and glomerulosclerosis in about 12% cases out of 851

autopsies of drug addicts who died of heroin addiction[28].

CONCLUSION:

Keeping in view the histopathological changes in kidneys preserved of 25 selected autopsies and their chemical analysis reports, it is concluded that heroin toxicity leads to multiple systemic changes in the body, which could be the leading factor of death of the individual. The histopathological changes in kidneys in the dead bodies of heroin addicts will help medicolegal men to assess their involvement as possible cause of death.

REFERENCES:

1. Dettmeyer RB, Preuss J, Wollersen H, Madea B. Heroin-associated nephropathy. Expert Opin Drug Saf.2005;4(1):19-28.
2. Graig Francis. US and Europe 'doing little to stem opium flow. CNN, November 27, 2001. Available from; www.cnn.com/2001/WORLD/asiapcf/central/11/27/gen.afghan.opium/index.html
3. Pakistan Narcotic Control Board. National Drug Abuse Assessment Study 2000-01,page17. Available from; http://www.bionity.com/en/encyclopedia/Anti-Narcotics_Force.html
4. Drug use in Pakistan 2013. UNODC (United nation office on drugs & crime & Ministry of Interior and narcotic control of Pakistan) page:05. Available from; http://www.unodc.org/documents/pakistan/Survey_Report_Final_2013
5. Dark S, Kaye S, Duflou J. Systemic disease among cases of fatal opioid toxicity. Addiction. 2006;101(9):1299-305.
6. Krishan V. Heroin:Text book of Forensic Medicine & Toxicology, Principles & Practice. 3rd ed. New Delhi: Churchill Living stone;2005.p.685.
7. Sreepada Rao TKS, Nicastri AD, Friedman EA. Renal consequences of narcotic abuse. Adv Nephrol Necker Hosp.1977;7:261-90.
8. Gatt,M.M. Drug dependence, Oxford University press. 1977,5-15.
9. Cunningham EE, Zielezny MA, Venuto RC. Heroin-associated nephropathy. A nationwide problem. JAMA. 1983; 250 (21): 2935-6.
10. Crowe AV, Howse M, Bell GM, Henry JA. Substance abuse and the kidney. QJM.2000; 93(3):147-52.
11. Orth SR. Adverse renal effects of legal & illicit drugs. Ther Umsch. 2002;59:122-30.
12. Kilocyne MM Gocke DG, Meltzer JI, Daly JJ, Thomson GE, Hsu KC, et al: Nephrotic syndrome in heroin addicts. Lancet. 1972; 1: 17-22.
13. Neugarten J, Gallo GR, Buxbaum J, Katz LA, Rubenstein J, Baldwin DS Amyloidosis and subcutaneous heroin abusers ('skin poppers' amyloidosis'). Am J Med 1986; 81(4):635-40.
14. Jaffe AA, Kimmel PL. Chronic nephropathies of cocain & heroin abuse: a Critical review. Clin J Am Soc Nephrol. 2006;1(4):655-67.
15. Tuazon CU, Hill R, Sheagren JN. Microbiologic study of street heroin and injection paraphernalia. J Infect Dis. 1974; 129(3):327-9.
16. Rao TK, Nicastri AD, Friedman EA. Natural history of heroin-associated nephropathy. N Engl J Med.1974;290(1):19-23.
17. Haskell LP, Glicklich D, Senitzer D. HLA associations in heroin associated nephropathy. Am J Kidney Dis 1988; 12(1):45-50.
18. Cunningham EE, Brentjens JR, Zielezny MA, Andres GA, Venuto RC. Heroin nephropathy. A clinicopathologic & epidemiological study. Am J Med.1980;68(1):47-53.
19. Treser G, Cherubin,C, Lonergan,ET, Yoshizawa N, Viswanathan V, Tannenberg AM, et al. Renal lesions in narcotic addicts. Am. J.Med.1974;57(5):687-94.
20. Rao TK, Nicastri AD, Friedman EA. Renal consequences of narcotic abuse. Adv Nephrol Necker Hosp.1977;7:261-90.
21. Malaton,R, Katz L, Gallo G, Waldo E, Cabaluna C, Eisinger RP. Glomerular sclerosis in adults with nephritic syndrome. Ann.Intern Med.1974;80(4):488-95.
22. Grisham E, Churg J, Porush JG. Glomerular morphology in nephrotic heroin addicts. Lab. Invest.1976;35(5): 415-24.

23. Dubrow A, Mittman N. Ghali V, Flamenbaum W. The changing pattern of heroin associated nephropathy. Am.J.Kidney Dis.1985;5(1):36-41.
24. Gallo GR, Neugertan J. Drug abuse with narcotics and other agents. In: Schrier RW, Gottschalk CW, editors. Diseases of Kidney. 5th ed. Boston, MA: Little Brown;1993. p.1291-336.
25. Rice EK, Isbel NM, Becker GJ, Atkins RC, McMahon LP. Heroin overdose and myoglobinuric acute renal failure. Clin Nephrol. 2000;54(6):449-54.
26. do Sameiro Faria M, Sampaio S, Faria V, Carvalho E. Nephropathy associated with heroin abuse in Caucasian patients. Nephrol Dial Transplant. 2003;18(11):2308-13.
27. Dettmeyer R, Wessling B, Madea B. Heroin associated nephropathy a post-mortem study Forensic Sri Int.1998;95(2):109-16.
28. Passarino G, Ciccone G, Siragusa R, Tappero P, Mollo F. Histopathological findings in 851 Autopsies of drug addicts, With Toxologic & Virologic correlation. Am J Forensic Med Pathol.2005;26(2):106-16.