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Application of UV light as a Screening Tool in Gross Examination of Heart at Autopsy

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ABSTRACT

Context: The conditions causing sudden death may be inherited and requires screening and counselling of the next of kin. In cases of death due to myocardial ischemia, identifying the early stages of myocardial pathology becomes difficult in postmortem as the gross changes do not appear for 24 to 48 hours following the ischemic damage to the heart. Hence, there is a need for a screening tool to identify the diseased part of the heart.

Aims: To determine the applicability of ultraviolet light for the detection of cardiac pathology at autopsy.

Settings and Design: This cross-sectional study was conducted from 1st January 2021 to 30th June 2022.

Methods and Materials: There were 200 cases in which there were 153 (76.5%) males and 47 (23.5%) females. All cases that were subjected to the medico-legal autopsy of more than 30 years old were included in our study. The cases were divided into 5-year intervals of age. Gross findings of the heart, if any were noted. The heart was dissected using the inflow-outflow method. The internal and external surfaces of the heart were seen under wood's lamp fluorescence. Sections from areas that showed fluorescence under ultraviolet light were taken and subjected to histopathology examination. The specimen was processed, and a histopathology slide was prepared and examined. Routine haematoxylin & eosin staining was done.

Statistical Analysis Used: After the collection and compilation of data, statistical tests were applied to analyze the data. The mean and standard deviation (SD) were calculated for quantitative data, and for qualitative data, the proportion was calculated. Data were analyzed using SPSS version 20.0 software.

Result: A significant relationship was observed between heart pathology in correlation to age and sex. The sensitivity

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of wood's lamp was also found to be significant in fluorescent positive cases. By identifying discrepancies between gross, fluorescence, and microscopic findings, our findings suggest that histopathology has a major impact on the interpretation of heart pathology and determining the cause of death at autopsy.

Conclusion: In this study, we have worked on a new aspect of the diagnostic property of ultraviolet light (UV) extending to recent and acute myocardial infarction besides old myocardial infarction that can aid pathologists in gross heart examination, especially in more guided sampling for histopathological examination. Histopathological studies provide the most accurate clues to better understand cardiac pathology.

Keywords: Myocardial Infarction; Ultraviolet light; Screening; Gross pathology.

INTRODUCTION

As per the World Health Organization (WHO) around 17.9 million people died from cardiovascular diseases in 2019, representing 32% of all worldwide deaths. Of these deaths, 85% were attributed to myocardial infarction and stroke. Out of the 17 million premature deaths which are usually described under the age of 70 due to non-communicable diseases in 2019, 38% were caused by cardiovascular diseases (CVDs).[1] According to the American Heart Association, in 2019 approximately 121.5 million adults in the United States had some form of cardiovascular disease.[2] The World Health Organization (WHO) states that more than 85% of cardiovascular deaths occur in low and middle income countries.[3] The World Heart Federation predicts more than 23 million cardiovascular disease related deaths per year by 2030.[4] An estimated 1.3 million Indians died from coronary artery disease (CAD) in 2000. The projected death from coronary artery disease (CAD) by 2015 was 2.95 million, but overall, around 6.4 million cases of coronary artery disease (CAD) were reported in the year 2015.[5]

The role of autopsy in sudden death is to establish whether death is attributable to cardiac disease or to other causes of sudden death, the nature of the cardiac disease, whether the mechanism was arrhythmic or mechanical, and finally, whether the condition causing sudden death may be inherited, requires screening and counselling of the next of kin.[6]

However, unlike the experimental settings, it is impossible to determine the exact time of ischemia because conditions such as preinfarction angina and collateral blood flow often complicate determining the duration of ischemia.[7] Though there is a significant decline in mortality from coronary artery disease (CAD), this disease still remains the leading killer in adults of all ages. Though most prevalent in the elderly, coronary artery disease (CAD) also affects young adults. Cardiac death due to coronary artery disease (CAD) is the most common cause of sudden death in young adults aged between 35-55 years.[8]

Many times, in cases of death due to suspected cardiac pathology, findings are not detected in gross pathology and autopsy surgeons need to preserve heart specimens for further examination. In cases where sudden death occurs at a very early stage of infarction, the myocardial lesions cannot be easily detected by traditional macroscopic examination or routine histological stains. Hence, the opinion regarding the cause of death is delayed which often adds to the grievance of the relatives. Many times, normal parts of the heart are preserved instead of diseased parts which may result in non-conclusive things on histopathological examination and results in negative autopsy. Hence, there is a need for a screening tool to identify the diseased part of the heart. One such tool is the use of ultraviolet (UV) light. This study was conducted to explore the applicability of ultraviolet light as a screening tool in the gross examination of the heart at autopsy.

The application of ultraviolet light in forensic practice has wide range of applicability.[9-14] M. Bohnert *et al* (2000)[15] performed an ultraviolet fluorescence test on the hearts of 30 individuals who died from cardiac causes. Solhi Hassan *et al* (2012),[16] also studied 204 cases suspected of myocardial infarction under UVB hand lamps and they found the sensitivity and specificity of wood's lamp was 100% and 93.5% respectively.

Fluorescence methods are attractive as they supply a rapid, and non-destructive way of screening

large and multiple objects. If the efficacy of fluorescence detection is enhanced, its effectiveness as a rapid screening tool would be increased.[17] The use of a wood's lamp doesn't require great expertise. However, important points should be considered to avoid misapprehension of results. They are as follows:

1. The lamp should be kept to warm up for around 1 minute.
2. The room for the examination should be dark, preferably a room without windows.
3. The examiner should get dark-adapted in order to see the difference more accurately.
4. The wood's lamp should be 4 to 5 inches from the object/fluid.[18]

MATERIALS AND METHODS

The present cross-sectional observational study was carried out at the Department of Forensic Medicine and Toxicology, Shyam Shah Medical College, Rewa from 1st January 2020 to 30th August 2022, after obtaining ethical clearance from Institutional Ethics Committee (IEC). All cases that were subjected to the medico-legal autopsy of more than 30 years old were included in our study. All decomposed and charred bodies were excluded from the study.

In the study conducted, the heart was dissected out from the body and washed under tap water. The heart was not weighed at this point, as it contained blood clots which could have falsely elevated the weight, leading to mistaken impressions of hypertrophy.[19] The gross findings if any were noted and the outer surface of the heart was seen under wood's lamp fluorescence in the dark room and any fluorescent area was noted. Coronary arteries were dissected and changes if any, were documented. The heart was dissected using the inflow-outflow method.[20] After the dissection of the heart, the internal surface of the heart was seen under wood's lamp fluorescence in the dark room and fluorescent area if any was noted. After that, the transverse slices of the heart were made and again seen under wood's lamp fluorescence for any fluorescent area.

Wood's lamp of 'Dermaindia', range 320-400 nm, 2X4 W was used in the present study. The gross findings if any were noted and the outer surface of the heart was seen under wood's lamp fluorescence in the dark room and any fluorescent area was noted. Coronary arteries were dissected and changes if any, were documented. After the dissection of the heart, the internal surface of the heart was seen under wood's lamp fluorescence in the dark room and fluorescent area if any was noted. After that, the transverse slices of the heart were made and again seen under wood's lamp fluorescence for any fluorescent area. Gross pathology was considered in terms of an increase in weight of the heart >420 grams, occlusion of >50% in coronary arteries, infarct on the surface of the heart, signs of atherosclerosis, cardiac surgery/procedure, rupture of the heart, pathology of valves, increase in left ventricular wall thickness of >1.5 cm and increase in right ventricular wall thickness of >0.5 cm.[20, 21,22] Sections from areas that showed fluorescence under ultraviolet light were taken and subjected to histopathology examination and a control area from the same heart and chamber but from the site away from the fluorescent area was taken and preserved in a 10 percent formalin solution for fixation.

The specimen was then taken to the histopathology lab. Grossing of the samples was done, which included describing the specimen's size, shape, color, and overall general appearance, followed by placing samples of the tissue in processing cassettes. After staining the slides with haematoxylin and eosin stain it was viewed under an olympus microscope with magvision software and findings were observed and recorded.

After the collection and compilation of data, statistical tests were applied to analyze the data. The mean and standard deviation (SD) were calculated for quantitative data, and for qualitative data, the proportion was calculated. Data were analyzed using SPSS version 20.0 software. The data was tabulated as per guidelines for reporting statistics, JMIR Publication.[23]

RESULT AND DISCUSSION

In our study, there were 200 cases in which there were 153 (76.5%) males and 47 (23.5%) females. We observed male preponderance in our study. This is due to the reason that, males are bread earners and females usually do household work, making males more vulnerable to accidents, violence, and stress. Hence, males are more frequently subjected to medicolegal autopsies due to their involvement in outdoor activities. We divided the cases into 5-year intervals of age, so as to correlate with the total number of cases in each group. In our study, the age of the cases ranged from as low as 30 years to as high as 90 years. The highest number of cases i.e., 37 (18.5%) were in the age group of 30-35 years.

It was followed by 32 (16%) cases in the age group of 36-40 years. There were 28 (14%) cases in the age group of 41-45 years and 22 (11%) cases in the age group of 46-50 years (Table 1). This is in concordance with the studies of other authors that the male population in 3rd and 4th decades of life is most commonly encountered in medicolegal autopsies.[24,25,26]

Table 1: Distribution of cases according to age and sex

Age (years)	Males (%)	Females (%)	Total (%)
30-35 years	33 (16.5%)	04 (2%)	37 (18.5%)
36-40 years	29 (14.5%)	03 (1.5%)	32 (16%)
41-45 years	18 (9%)	10 (5%)	28 (14%)
46-50 years	19 (9.5%)	03 (1.5%)	22 (11%)
51-55 years	17 (8.5%)	09 (4.5%)	26 (13%)
56-60 years	12 (6%)	03 (1.5%)	15 (7.5%)
61-65 years	11 (5.5%)	04 (2%)	15 (7.5%)
66-70 years	02 (1%)	02 (1%)	04 (2%)
>70 years	12 (6%)	09 (4.5%)	21 (10.5%)
Total	153(76.5%)	47 (23.5%)	200 (100%)

In the present study, the average age of total cases was 49.7 years. Jhajj *et al*[24] observed that the average age of cases in their study was 39±2 years, which is almost similar to our study. However, Yazdi *et al*[26] observed the mean age in their study to be 30 years, which is lower than the present study. We observed that the mean age of cases in cardiac pathology was 54.85 years. Similarly, Dhruva *et al*[27] and Siddiqui *et al*[28] also observed the mean age of cases with cardiac pathology on histopathological examination to be 55±15 years and 55.1±17.16 years respectively. Garg M *et al*[29] and Sudha *et al*[30] also observed the average age in cardiac pathology to be 52 ± 14 years and 54 years respectively, which is almost similar to our study.

In the present study, on gross examination of 200 samples of the heart, we observed that 128 (64%) cases showed no remarkable findings and 72 (36%) cases showed significant gross pathology (Table 2). Yazdi *et al*[26] observed cardiac pathologies in 40% of the total cases, which is almost similar to the present study. Dhruva *et al*[27] observed cardiac

Table 2: Comparison of cases with gross pathology and positive fluorescence

Cases with norelevant gross pathology (n=128)		Cases with relevant gross pathology (n=72)		
Cases with no gross pathology and showing positive fluorescence	Cases with no gross pathology and not showing fluorescence	Cases with relevant gross pathology showing fluorescence	Cases with relevant gross pathology not showing fluorescence	TOTAL (n=200)
30 (15%)	98 (49%)	51 (25.5%)	21 (10.5%)	200 (100%)
128 (64%)		72 (36%)		

pathologies in 23.3% of the cases, which is lower than the present study. However, Garg M *et al*[29] and Vyas *et al*[31] reported a higher number of cardiac pathologies, in 46.4% and 73.45% of the total cases in their studies. We found the maximum number of gross pathology of hearts in the age group of 36-40 years i.e., 13 cases. This can be due to a higher number of cases in the age group of 36-40 years, than in other age groups. However, our observation contrasts with observations made by Siddiqui *et al*[28] who found the maximum number of cardiac pathologies in the age group of 51-60 years.

In the present study, coronary occlusion was seen most commonly in the age groups of 51-55 years and 61-65 years i.e., 7 (15.5%) cases in each group. Coronary artery occlusions of >50% were taken into account in our study. Coronary occlusion can be classified as slight narrowing, 30%; moderate narrowing 50%; and severe narrowing that is 70% and above.[32] Occlusions of >50% are considered significant.[33,34] The age groups that were affected by coronary artery disease ranged from 32-90 years. Similar to the present study, Siddiqui *et al*[28] and Garg M *et al*[29] also found coronary artery disease in the age range of 22-85 years and 20-70 years, respectively. Although calcification is found more frequently in advanced lesions, it may also occur in small amounts in early lesions, which appear in the 2nd and 3rd decades of life. It is due to ageing which is associated with structural and functional changes in the vessel wall, which result in decreased vascular distensibility and elevated arterial stiffness.[35]

We observed that the left anterior descending coronary artery (LAD) was the most common artery to be involved i.e., in 42 (21%) cases. Left circumflex artery (LCX) and right coronary artery (RCA) were affected in similar percentages i.e., in 19 (9.5%) cases each. Vyas *et al*,[31] Dhruva *et al*,[27] Siddiqui *et al*,[28] Garg *et al*,[36] Sudha *et al*,[30] and Yazdi *et al*,[26] also found the most frequent involvement of the left anterior descending coronary artery (LAD), which is similar to our study. However, they found

the right coronary artery (RCA) to be the least commonly involved which is in contrast with our study. Gradwhol quoted the range of left anterior descending coronary artery (LAD) to be 45-64%, while right coronary artery (RCA) comes next in frequency, 24-46%; followed by left circumflex (LCX) 3-10%; and least affected is the left main coronary artery.[37]

In the present study, we observed single vessels to be most affected i.e., in 19 (42.1%) cases. The isolated involvement of the left anterior descending coronary artery (LAD) was seen in 16 (35.5%) cases, and the right coronary artery was seen in 03(6.6%) cases. Frequent involvement of two and three vessels was also seen in the present study. Incidence of involvement of double vessels was seen in 17 (37.7%). In double vessels, we observed the left anterior descending coronary artery (LAD) and left circumflex artery (LCX) to be involved in 10 (22.2%) cases, the left anterior descending coronary artery, and right coronary artery in 07 (15.5%). Involvement of double vessels was followed by the involvement of triple vessels i.e., the left anterior descending coronary artery (LAD), left circumflex artery (LCX), and right coronary artery (RCA) in 09 (20%) cases. Hence, in the present study, the involvement of single vessels was more frequent than the involvement of double and triple vessels. This can be due to the reason that in our study there were maximum number of young patients. Piyush J *et al*[38] also observed the single vessels to be more frequently involved, which is similar to our study. In contrast to our observations, Vyas *et al*,[31] Dhruva *et al*,[27] Garg M *et al*,[29] and Yazdi *et al*[26] observed the triple vessels to be more frequently involved than single vessels.

We observed infarction on macroscopic examination in 14 cases (7%). Our findings were almost comparable with Maru[39] in 6.5% of cases, and Dhruva *et al*[27] in 9.72%. However, Garg M *et al*[29] observed evidence of myocardial infarction in 26.8% of cases which is higher than our study. According to the age of infarcts, they are classified as acute or recent, upto 4 weeks. In 4 to 6 weeks, an acute infarct turns into an old or healed infarct.[40] We observed that acute myocardial infarction (4 weeks) was present in 4 cases (2%). In one case, we observed an old healed myocardial infarction in form of a whitish patch and an acute myocardial infarction in form of a hyperemic border with central yellow-tan softening. Marwah *et al*[41] observed acute myocardial infarction in 7% of cases and old myocardial infarction in 3.5% of cases, which is almost similar to the present study. Vyas *et al*[31] observed a slightly higher percentage of acute myocardial infarction in 10.8% of cases and old myocardial infarction in 13.25% of cases. In the present study, we observed 10 male cases and 4 female cases of myocardial infarction at autopsy. Out of 4 females, 3 females were of the postmenopausal age group. Premenopausal women have a lower risk and incidence of hypertension and cardiovascular disease (CVD) compared to age-matched men and this sex advantage for women gradually disappears after menopause, suggesting that female hormones play a cardioprotective role in women. In the present study, cardiac rupture was seen in 03 (1.5%) cases, and in all the cases, we observed occlusion of the coronary artery (LAD, RCA, LCX) of more than >75%, which is considered a severe occlusion. Rao *et al*,[42] observed cardiac rupture with coronary occlusion in 31.07% of cases, which is higher than our study. This may be due to the reason that they have included cardiac deaths in their study. In all 03 cases, the rupture was seen on the postero-lateral surface of the left ventricle. Our findings were similar to those observed by Tas *et al*,[43] who observed the most common sites of cardiac wall rupture being the lateral wall and posterior wall of the left ventricle. Rupture of the left ventricular (LVW) wall during acute myocardial infarction (AMI) is nearly always fatal, and a higher frequency has been reported in hypertensive compared with normotensive patients.[44] On histopathological examination, the torn area also showed disintegration of dead myofibers, vacuolar degeneration surrounded by neutrophils, abundant mononuclear infiltration, and the aorta showed atherosclerotic changes. An increase in right ventricular wall (RVW) thickness of >0.5cm is considered significant.[19] We observed an increase in right ventricular wall (RVW) thickness was seen in 5 (2.5%) cases. Siddiqui *et al*[28] observed an increase in right ventricular wall (RVW) thickness in 16.6% of cases, which is higher than our study. In the present study, we observed that all 05 cases of an increase in right ventricular wall (RVW) thickness, were associated with an increase in left ventricular wall (LVW) thickness and coronary occlusion in 04 cases. Anna S *et al*[45] found a predominance of right ventricular hypertrophy and left ventricular hypertrophy in men aged 60-79 years and obese individuals.

However, we observed a predominance of right ventricular hypertrophy much earlier in men aged between 35-87 years old. In our study, we also observed that in 02 cases, an increase in right ventricular wall thickness was associated with a history of cardiac procedures (bypass grafting and

ventricular septal defect repair). Bhattacharya *et al*[46] documented right ventricular hypertrophy in response to pressure overload, most commonly due to pulmonary hypertension and conditions affecting the tricuspid valve. Moreover, Attoh *et al*[47] have reported right ventricular hypertrophy to be due to an increase in COVID-19 infections due to pathological effects of COVID-19 infection in the lungs as adult respiratory distress syndrome/diffuse alveolar damage with thromboembolic phenomena. Hence, an unexplained increase in right ventricular wall thickness (RVW) can be, due to COVID-19 infection which was on a surge, at a point of time in our study.

Many times, it is seen that when gross pathology could not help to evaluate the cause of death, microscopic examination can conclusively opine the involved cardiac pathology.[48] Thus, the histopathological examination was considered to be the gold standard in our study. In our study, we observed waviness of muscle fibers in 20 cases, coagulative necrosis in 05 cases, waviness and neutrophilic infiltration in 04 cases, chronic myocarditis and necrosis in 03 cases, and waviness of muscle fibers and coagulative necrosis in 01 case. The histopathological findings we observed in our study, of myocardial infarction were similar to those given by Kumar *et al*,[49] Bouchard and Majno,[50] and Smilowitz NR[51] which include, wavy myofibrils, coagulation necrosis, hemorrhage, and neutrophilic infiltrate. Siddiqui *et al*[28] and Garg *et al*[36] also reported similar findings of myocardial infarction in their studies.

Among 200 cases, 81 (40.5%) fluorescent positive cases were subjected to histopathological examination along with a control sample from the same heart and chamber, but away from the fluorescent area i.e., nonfluorescent area. We found that 33 (16.5%) cases showed significant histopathological findings and 48 (24%) cases were histopathologically unremarkable. In our study, the waviness of muscle fibers was the most predominant finding on histopathological examination and was seen in 20 (24.6%) cases. It is often the earliest change of myocardial infarction observed in a microscope and has been a characteristic and diagnostic feature of myocardial infarction.[51] However, Derias *et al*[52] have raised considerable suspicion about the specificity and reliability of the wavy fiber as a histopathological index of myocardial infarction as they were seen in about half the normal and half of the infarcted human hearts and were even present in heart of the 6-week-old infant and was prominent in older subjects. Such fibers were also indistinguishable from those around areas of myocardial infarction. In the present study, chronic myocarditis with necrosis was seen in 03 (3.7%) cases. In 02 cases, it was associated with a history of coronary artery bypass grafting (CABG) and angioplasty. In 01 case, it was found as an incidental finding. Myocarditis is an inflammatory condition of the heart muscle and its causes are extremely varied and include infectious and non-infectious agents.[53] In our study all the cases of myocarditis were males. Our findings were consistent with those of Okoda *et al*,[54] who reported male preponderance in chronic myocarditis in their study. However, we reported a lesser percentage of myocarditis than Joshi C *et al*[55] (9%), Basso C *et al*[56] (10%), Ozdemir *et al*[57] (7%), Dory *et al*[58] (25%), and Karmer *et al*[59] (29%). Although congestion was considered an insignificant finding in our study, we observed congestion of the myocardium in 47 (58%) cases which was higher than observed by Jhajj *et al*[24] in 24% of cases in their study.

In our study, the maximum number of significant histopathological findings (waviness of muscle fibers, coagulative necrosis, neutrophilic infiltration, chronic myocarditis, and necrosis) were observed in the age group of 46-70 years. Siddiqui *et al*[28] observed maximum cases of myocardial infarction in the age groups of 51-60 years which is almost similar to our study. Dhruva *et al*[27] observed the maximum number of cases with findings of myocardial infarction in age groups of 32-80 years. Garg M *et al*[29] also observed a maximum number of cases of myocardial infarction in the age group of 29-80 years. In the present study, we observed a maximum number of histopathologically significant findings i.e., 17 fluorescent positive areas in the posterior wall of the left ventricle, and 02 fluorescent positive areas on the anterior wall of the left ventricle, which showed histopathologically significant findings. The posterior wall of the right ventricle showed 10 fluorescent areas. Verma *et al*[60] and Mortensen *et al*[61] also observed that the posterior ventricular wall is most commonly involved in ischemic heart disease.

However, Hassan *et al*,[16] observed the sensitivity and specificity of wood's lamp was 100% and 93.5% respectively. The sensitivity observed by them is much higher than the sensitivity observed in our study. This can be due to the reason that they had included cases of suspected myocardial infarction in their study. The areas of infarction varied in their study and they sent only one sample from any of the fluorescent areas observed by them. But in our study, we had sent all the fluorescent areas for

histopathological examination. In our study, 40.5% of the hearts showed bluish-white fluorescence under wood's lamp and when they were subjected to histopathological examination, 16.5% showed evidence of myocardial pathology (Table 3). However, Bohnert *et al*[15] observed that 33% of the hearts showed bluish-white fluorescence under wood's lamp and when these were correlated with 104 microscopic examination 9% of cases showed patches of myocardial infarction. So, we reported higher sensitivity of wood's lamp examination of cardiac pathology than observed by Bohnert *et al.*[15]

Table 3: Results of the wood's lamp fluorescence

Wood's lamp fluorescence-positive cases (n=81)		Wood's lamp fluorescence -negative cases (n=119)	Total (n=200)
HPE Significant	HPE Unremarkable		
33 (16.5%)	48 (24%)	119 (59.5%)	200 (100%)

Table 4: Distribution of cases according to gross findings in fluorescence positive and its correlation with histopathology results

Gross findings observed in fluorescence-positive cases (n=81)	Number of cases	HPE significant (%)	HPE negative (%)
Coronary artery disease	34	23 (67.6%)	11 (32.3%)
Increase in cardiac weight	28	14 (50%)	14 (50%)
Left ventricular hypertrophy	22	16 (72.7%)	6 (27.2%)
Fibrotic areas/ Infarcts	9	8 (88.8%)	0 (11.1%)
Right ventricular hypertrophy	04	04 (100%)	00 (0%)
Cardiac procedure (Bypass surgery, angioplasty and ventricular septal defect repair)	04	04 (100%)	00 (0%)
Rupture of heart	03	02 (66.6%)	01 (33.3%)
No gross pathology	28	03 (10.7%)	25 (89.2%)

Table 5: Sensitivity of wood's lamp

Wood's lamp fluorescence – positive cases (n=81)		Wood's lamp fluorescence - negative cases (n=119)	Total (n=200)
Cases with significant HPE finding	Cases with no significant HPE findings		
33(A)	48(C)	119(D)	200
81 (A+C)			

Fig. 1: Wood's lamp

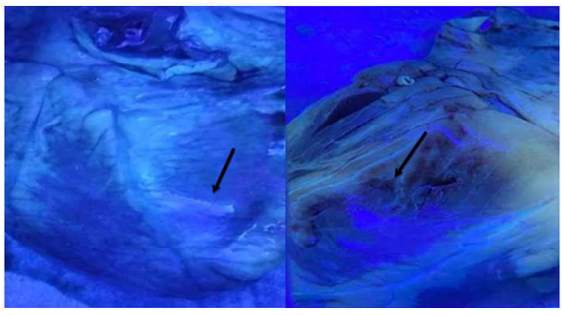

Fig. 2: Fluorescent areas under wood's lamp illumination

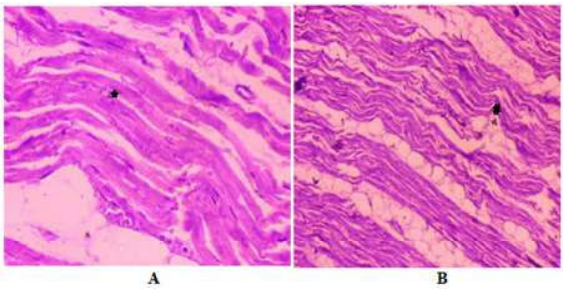

Fig. 3: Histology of myocardium showing
A. Waviness of muscle fibers (10x)
B. Section showing neutrophilic infiltration(40x)
(*waviness of muscle fibres, #neutrophilic infiltration)

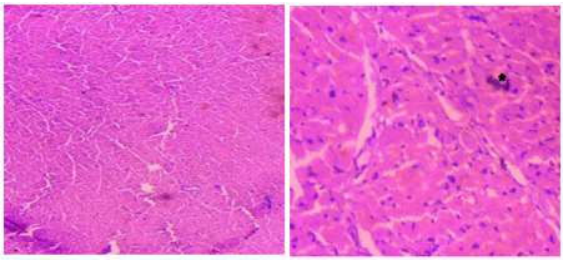

Fig. 5: Histology of unremarkable myocardium
A. Section showing unremarkable myocardium (4x)
B. Section showing congested myocardium. (40x)
(*congestion of myocardium)

(Table 5)

CONCLUSION

World Health Organization (WHO) scientific group once said 'Since many cases of sudden death from acute ischemic heart disease become the subject of medico-legal autopsy, it is essential that forensic pathologists should be well acquainted with the most suitable techniques and be able to put them into practice.[62] Postmortem diagnosis of early myocardial infarction is an ever recurrent problem in forensic pathology due to the lack of good conventional techniques for the diagnosis of myocardial ischemia. In the present study, we observed that gross examination could alone identify 71% of cardiac pathologies as confirmed by subsequent

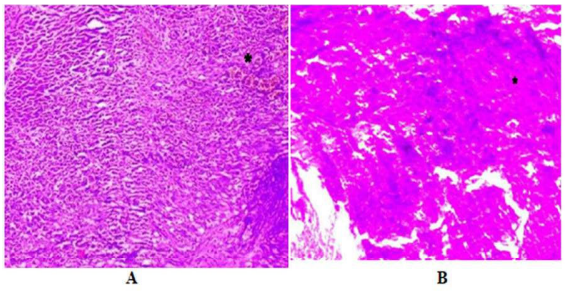

Fig. 4: Histopathology of myocardium
A. Section showing chronic inflammatory infiltrate consisting of lymphocytes and plasma cells. (10x)
B. Areas showing coagulative necrosis. (40X)

histopathological examination, which is far more than the wood's examination. Hence, we can conclude that if a gross examination of the heart is done properly at autopsy, it can detect most of the cardiac pathologies.

RECOMMENDATION

To determine the better efficacy of wood's lamp fluorescence, cases of known cardiac pathology should had been taken into account. We did not perform the histopathological examination on all the cases. All hearts i.e., fluorescent and non-fluorescent should had been sent for the histopathological examination. The waviness of fibers was the most predominant finding in wood's lamp fluorescence positive samples and it has been discussed earlier that the waviness of muscle fibers is not specific to myocardial infarction. Failure to access the clinical history of autopsy cases was another restriction of our study. Although sampling was not conducted systematically, there was no bias of age or gender within our sample. The study was conducted on autopsy cases from the Vindhya region only. As sample size is less and number of reference studies are very few, further studies with greater sample size is recommended.

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