THE OFFICIAL PUBLICATION OF

IJMJ

GLAFIMS ASSOCIATION

International Journal of Medical Justice

VOLUME-II NUMBER-I

2024

Intl ISSN [CIEPS]: 3006-208X(Print)

Intl ISSN [CIEPS]: 3006-2098(Online)

National [E-ISSN: 2583-7958]

An international peer and expert reviewed journal dedicated in the service of Forensic Medicine, Forensic Toxicology, Forensic Science and Allied Forensic Sciences

Web: www.ijmj.net Email: editor@ijmj.net

International Journal of Medical Justice

Official Publication of GLAFIMS ASSOCIATION

An international peer and expert reviewed journal in the service Of Forensic Medicine, Forensic Toxicology, Forensic Science and Allied Forensic Sciences

Email: editor@ijmj.net **Web:** https://www.ijmj.net

Table of Content

Volume 2, Issue 1 January- June, Year 2024

International ISSN [CIEPS]: 3006-208X [Print] 3006-2098[Online] Online E-ISSN [INDIA]: 2583-7958

Date of Publication: Sunday June 30, 2024

Date of Online Availability: Sunday June 30, 2024

Content list Available at https://www.ijmj.net/archive/2024/1

Journal DOI [V2N1]: https://doi.org/10.5281/10.5281/zenodo.12601044

Journal Homepage: https://www.ijmj.net

Editorial Board: https://www.ijmj.net/editorialboard.htm

Indexing, Listing and Archiving: The Journal is indexed in International Scientific Index, Index Copernicus, ABCD Index. The Journal is listed in List of Journal of ICMJE, Archived in Zenodo open repository developed under the European OpenAIRE program and operated by CERN. IJMJ is archived on Journal Website. Available in GitHub.

Editorial Office:

G-1, City Center, Medical College Road, Aligarh 202001 UP, INDIA

Email: glafims@gmail.com **web:** www.glafims.org **Mobile No:** 0091-9897830036

International Journal of Medical Justice

Official Publication of GLAFIMS ASSOCIATION

An international peer and expert reviewed journal in the service Of Forensic Medicine, Forensic Toxicology, Forensic Science and Allied Forensic Sciences

Email: editor@ijmj.net **Web:** https://www.ijmj.net

Editor-in-Chief/Editor
International Journal of Medical Justice
Head office Address:
G-1, Ground Floor, City Center, Medical Road,
Aligarh 202002 India
E-Mail: editor@ijmj.net Website of Journal: www.ijmj.net

Editorial Office:
G-1, City Center, Medical College Road, Aligarh 202001 UP, INDIA
Email: glafims@gmail.com **web:** www.glafims.org **Mobile No:** 0091-9897830036

International Journal of Medical Justice

Official Publication of GLAFIMS ASSOCIATION

ISSN: 2583-7958(Online)

An international peer and expert reviewed journal in the service Of Forensic Medicine, Forensic Toxicology, Forensic Science and Allied Forensic Sciences

Email: editor@ijmj.net **Web:** https://www.ijmj.net

Authors Agreement Form, IJMJ

Undertaking

I/We the undersigned declare that this manuscript titles is original, has not been published before and is not currently being considered for publication elsewhere.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed.

We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We understand that the Corresponding Author is the sole contact for the Editorial process. He/she is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs.

Signature:	**Signature:** .....
Name:	**Name:** .....
Date:.....	**Date:**.....
Place:	**Place:** .....

Editorial Office:

G-1, City Center, Medical College Road, Aligarh 202001 UP, INDIA

Email: glafims@gmail.com **web:** www.glafims.org **Mobile No:** 0091-9897830036

International Journal of Medical Justice

Official Publication of GLAFIMS ASSOCIATION

An international peer and expert reviewed journal in the service Of Forensic Medicine, Forensic Toxicology, Forensic Science and Allied Forensic Sciences

Email: editor@ijmj.net **Web:** https://www.ijmj.net

Table of Content

Volume 2, Issue 1 January- June, Year 2024

International ISSN [CIEPS]: 3006-208X [Print] 3006-2098[Online] Online E-ISSN [INDIA]: 2583-7958

Date of Publication: Sunday June 30, 2024

Date of Online Availability: Sunday June 30, 2024

Content list Available at https://www.ijmj.net/archive/2024/1

Journal DOI [V2N1]: https://doi.org/10.5281/10.5281/zenodo.12601044

Journal Homepage: https://www.ijmj.net

Editorial Board: https://www.ijmj.net/editorialboard.htm

Indexing, Listing and Archiving: The Journal is indexed in International Scientific Index, Index Copernicus, ABCD Index. The Journal is listed in List of Journal of ICMJE, Archived in Zenodo open repository developed under the European OpenAIRE program and operated by CERN. IJMJ is archived on Journal Website. Available in GitHub.

Editorial Office:

G-1, City Center, Medical College Road, Aligarh 202001 UP, INDIA

Email: glafims@gmail.com **web:** www.glafims.org **Mobile No:** 0091-9897830036

International Journal of Medical Justice

Official Publication of GLAFIMS ASSOCIATION

An international peer and expert reviewed journal in the service Of Forensic Medicine, Forensic Toxicology, Forensic Science and Allied Forensic Sciences

Email: editor@ijmj.net **Web:** https://www.ijmj.net

Editor-in-Chief/Editor
International Journal of Medical Justice
Head office Address:
G-1, Ground Floor, City Center, Medical Road,
Aligarh 202002 India
E-Mail: editor@ijmj.net Website of Journal: www.ijmj.net

Editorial Office:
G-1, City Center, Medical College Road, Aligarh 202001 UP, INDIA
Email: glafims@gmail.com **web:** www.glafims.org **Mobile No:** 0091-9897830036

Content list Available at ijmj.net

International Journal of Medical Justice

Journal Homepage: https://www.ijmj.net

Editorial: IJMJ-V2-N1-2024

Impact of a Scientific Medical Journal

Article History:

Date of Submission: Monday January 15, 2024

Date of Revision: Saturday, January 20, 2024

Date of Acceptance: Saturday, January 20, 2024

Date of Publication: Sunday, June 30, 2024

Digital Object Identifier **[DOI]**: https://doi.org/10.5281/zenodo.12600747

Available Online: Sunday, June 30, 2024

Website Archive: https://www.ijmj.net/archive/2024/1/editorial-v2n1.pdf

Citation: 1. Imran S. Editorial: Impact of a Scientific Medical Journal. Vol. 2, International Journal of Medical Justice. GLAFIMS ASSOCIATION; 2024 Jun p. 01-2.

Indexing: Indexed in OpenAIRE, INTERNATIONAL Scientific Indexing, LetPub, INDEX COPERNICUS INTERNATIONAL, ASCI

The impact factor of a scientific medical journal is well exploited to determine the impact of a scientific medical publication. Many scholars, even at the beginning stages of their careers, are interested in publishing their scientific manuscripts in journals of high impact and repute. The craziness about reaching a good-ranking journal made them target high publication charges, and publishing houses with a monopoly of taking advantage of this sick approach with the mushrooming of associated businesses like formatting and English and grammatical correction, which are sometimes not at all necessary for the core scientific idea to be published. The author has also noticed that while accepting and executing the reformatting and modifications suggested by the journal to meet journal requirements, the true idea of the core research is sometimes faded enough that some new conclusion can be easily achieved. Not only a new conclusion, but there is also a discrepancy in balancing the article with its individual components. The non-scientific staff of a reputed scientific medical journal with a limited understanding of the scientifically relevant facts may sometimes suggest mandatory modifications and formatting, which sometimes distort the manuscript

contents. The article cannot even be forwarded to the reviewers without this initial screening by non-scientific, irrelevant reviewers with the power to move the article to the next level. The impact factor (IF) is a measure of the frequency with which the average article in a journal has been cited in a particular year. It is used to measure the importance or rank of a journal by calculating the number of times its articles are cited. As a scientist, I personally disagree with the idea that an impact factor is to be utilized to measure the rank of a scientific medical journal. The question to be answered here is whether it is required to cite a publication. Let me give an example: I have done research and found something remarkable, but it is not cited because the topic of another scientist is different from mine. What will happen in this situation?

Moreover, indexing agencies have their own standards for indexing journals, which are difficult to achieve in the first two years of a new scientist journal. On the other side of the coin, some ghostly journals have successfully achieved indexing of their journals despite strict regulations by indexing agencies, making a mockery of the system.

The bitter question is: Who will control the scientific publications? Surely it is not within the control of the authors. The necessity of publishing by the authors makes them compromise their core scientific research idea and publish an idea suitable for journals and publishing houses.

In conclusion, at present, scientific publishing is not the free will of the scientist; it is rather a mutual bond between researcher and publisher. The author suggest that the impact factor of the journal alone is not a good quality indicator for measuring the ranks. Scientific publishing is like putting one brick on another with a limited understanding of the basement, which might be standing on the wrong scientific principles [Which might me a result of erroneous publications]. There is a very limited chance to correct false and fake scientific publishing, as the staff available to review the data is limited. This makes the review of data beyond the capacity of human civilization. AI may be a promising solution but have its own limitations.

Dr Imran Sabri, MD FRCP Edin, FFLM
Editor-in-Chief
International Journal of Medical Justice
Email: editor@ijmj.net

Sunethra Santosh [2024]. International Journal of Medical Justice, IJMJ, Volume 2, Issue 1: January-June 2024 [E-ISSN: 2583-7958] International ISSN [CIEPS]: 3006-208X[Print] 3006-2098[Online]

Content list Available at ijmj.net

International Journal of Medical Justice

Journal Homepage: https://www.ijmj.net

Case Report:

High voltage electrocution injury – A case report

Sunethra Santosh*, K.Parvathi**

*Post-Graduate Student, ** Professor and Head, Department of Forensic Medicine and Toxicology, Government Medical College Mahabubnagar, Telangana, India

Article History:

Date of Submission: Sunday July 09, 2023

Date of Start of Review Process: Monday July 10, 2023

Date of Receipt of Reviewers Report 1: Friday July 21, 2023

Date of Receipt of Reviewers Report 2: Wednesday August 16, 2023

Date of Revision: Tuesday January 2, 2024

Date of Acceptance: Wednesday January 3, 2024

Date of Publication: Sunday June 30, 2024

Digital Object Identifier **[DOI]**: https://doi.org/10.5281/zenodo.12600597

Available Online: Sunday June 30, 2024

Website Archive: https://www.ijmj.net/archive/2024/1/IJMJ-2024-18.pdf

Citation: 1. Sunethra S, Parvathi P. High voltage electrocution injury – A case report. Vol. 2, International Journal of Medical Justice. GLAFIMS ASSOCIATION; 2024 Jun p. 03–8.

Indexing: OpenAIRE, INTERNATIONAL Scientific Indexing, LetPub, INDEX COPERNICUS INTERNATIONAL, ASCI

Keywords: High Voltage Electrocution, Burns, Electrical Injuries, Accidents.

Academic Editor: Dr B. Vasanth Naik

Correspondence:

Dr Sunetra Santosh
Department of Forensic Medicine and Toxicology,
Government Medical College Mahabubnagar, Telangana, India
Email: sunethrasantosh0494@gmail.com

ORCID: https://orcid.org/0009-0007-7923-5898

Abstract:

High voltage electrical injuries are unusual but show a high mortality rate. Injuries caused by electrocution respect all the known laws of physics and thus are predictable in their manifestations. The passage of substantial electric current through the human body can cause skin lesions, organ damage and even death. Electrical injuries are usually accidental in nature. In this case report discussed the injuries sustained by an adult, due to contact with high tension electrical wire. It is concluded that the cause of death was electrocution induced flame burn injuries.

Introduction: Electrical injury is a physiological reaction caused by electric current passing through the body. The injury depends on the density of the current, tissue resistance and duration of contact. Very small currents may be imperceptible or produce a light tingling sensation. A shock caused by low and otherwise harmless current could startle an individual and cause injury due to jerking away or falling. Stronger currents may cause some degree of discomfort or pain, while more intense currents may induce involuntary muscle contractions, preventing the person from breaking free of the source of electricity. Still larger currents result in tissue damage & may trigger ventricular fibrillation or cardiac arrest. Consequences of injury from electricity may include amputations, bone fractures and orthopedic and musculoskeletal injuries. If death results from an electric shock the cause of death is generally referred to as electrocution.

Case Report: A partly decomposed body of 35-year-old male, mason by occupation was brought for postmortem examination to the mortuary of Government General Hospital, Mahabubnagar. According to the investigating police officer the victim was found dead on the railway track, next to a high-tension electrical wire. Body was dressed in brown full hand shirt and blue pants. He was last seen by his wife 48 hours before the incident. The autopsy revealed the following findings which were observed during external examination:

Body showed signs of decomposition like swelling of face, distended scrotum and skin peeling. Bloodstained discharge seen from nose and mouth.

Antemortem dermo epidermal burns present all over the body except the face and feet. Reddish discoloration of the skin present over the burnt areas. Body showed multiple punched out lesions (crocodile flash burns) over the left side of anterior aspect of

chest, abdomen, both thigh and leg region. Genital region was also involved. Superficial burns with singeing of hair also seen. Blebs were present all over the body. Total body surface area involved in burns was 80%.

On internal examination: All the visceral organs were congested and petechial hemorrhages were seen over the heart. Brain was partially liquified.

Discussion: The cause of death in this case was opined as death due to electrocution. The crocodile flash burns seen in the victim's body is as a result of high voltage electric current which can result in sparking. In high voltage accidents, direct contact with the wire is not necessary. As the body approaches the high voltage line, an electric current may jump from the line to the body. Death from high voltage electrocution is caused by either the electro thermal injury produced by the current, or respiratory arrest. Electrocution from these lines occurs when they break, fall to ground, or is touched by a victim. If burns occur from contact with high voltage electric wire, third degree burns will be present. In contrast to low voltage burns, high voltage burns are extremely severe with charring of body.

The minimum current a human can feel depends on the current type (AC or DC). A person can sense electrical current as low as 1 mA (rms) for 60 Hz AC and as low as 5 mA for DC. At around 10 mA, DC current passing through the arm of a 68-kilogram (150 lb) human can cause powerful muscle contractions; the victim is unable to voluntarily control muscles and cannot release an electrified object. This is known as the "let go threshold" and is a criterion for shock hazard in electrical regulations.

The current may, if it is high enough and is delivered at sufficient voltage, cause tissue damage or fibrillation which can cause cardiac arrest; more than 30 mA of AC or 300–500 mA of DC at high voltage can cause fibrillation. A sustained electric shock from AC at 120 V, 60 Hz is an especially dangerous source of ventricular fibrillation because it usually exceeds the let-go threshold, while not delivering enough initial energy to propel the person away from the source. However, the potential seriousness of the shock depends on paths through the body that the currents take. If the voltage is less than 200 V, then the human skin, more precisely the stratum corneum, is the main contributor to the impedance of the body in the case

of a macroshock—the passing of current between two contact points on the skin. If the voltage is above 450–600 V, then dielectric breakdown of the skin occurs. The protection offered by the skin is lowered by perspiration, and this is accelerated if electricity causes muscles to contract above the let-go threshold for a sustained period of time.

Conclusion: The incidence of high voltage electrical injuries is less frequent compared to other forms of electrical injuries. A detailed history regarding the incident, scene visit and proper postmortem examination with histopathological examination is recommended prior to concluding the cause of death. Proper education and awareness programs for general public regarding electric safety will reduce the number of such cases. Insulating high tension electric wires would insulate life.

Ethical approval

None/Not Applicable

Funding

None/Self-Funded

Conflicts of interest

No conflicts of interest.

References:

1. Knight's Forensic Pathology: Pekka Saukko, Bernard Knight. 4th Edition [2024], CRC Press. ISBN 9780340972533
2. Textbook Of Forensic Medicine And Toxicology 2019. Pillay, V. V. Educa Books: ISBN 8181915062
3. https://en.wikipedia.org/wiki/Electrocution Last accessed on July 1, 2023
4. https://pubmed.ncbi.nlm.nih.gov/1772475/. Last accessed on July 1, 2023
5. https://www.ijfmts.com/article-details/9263 Last accessed on July 1, 2023
6. https://www.academia.edu/37186618/Accidental_High_Voltage_Electrocution_a_Case_Report Last accessed on July 1, 2023

Sundaragiri Suraj [2024]. International Journal of Medical Justice, IJMJ, Volume 2, Issue 1: January-June 2024 [E-ISSN: 2583-7958] International ISSN [CIEPS]: 3006-208X[Print] 3006-2098[Online]
Content list Available at ijmj.net

International Journal of Medical Justice

Journal Homepage: https://www.ijmj.net

Review Article:

Arachnoid Granulations: An Overview

Sundaragiri Suraj*, Chaitanya Mittal, B. Vasanth Naik***, Shreya Bansal****, Imran Sabri*****

* Assistant Professor, ***Associate Professor, Department of Forensic Medicine and Toxicology, Gandhi Medical College, Secunderabad, Telangana

**Assistant Professor, Department of Forensic Medicine & Toxicology, Dr. B. C. Roy Multi-speciality Medical Research Centre, Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India

****Resident, St. George University School of Medicine, Newcastle upon Tyne, GBR, United Kingdom of Great Britain & Northern Ireland.

*****Head, Forensic Medicine Division, Department of Bio-Medical Sciences, College of Medicine, King Faisal University, P.O. Box No. 400 Al-Ahsa. KSA

Article History:

Date of Submission: Monday January 1, 2024

Date of Start of Review Process: Tuesday January 2, 2024

Date of Receipt of Reviewers Report: Wednesday January 24, 2024

Date of Revision: Thursday February 22, 2024

Date of Acceptance: Friday May 31, 2024

Date of Publication: Sunday June 30, 2024

Digital Object Identifier **[DOI]**: https://doi.org/10.5281/zenodo.12600684

Available Online: Sunday June 30, 2024

Website Archive: https://www.ijmj.net/archive/2024/1/IJMJ-2024-216.pdf

Citation: 1. Sundaragiri S, Chaitanya M, B. Vasanth N, Shreya B, Sabri I. Arachnoid Granulations: An Overview. Vol. 2, International Journal of Medical Justice. GLAFIMS ASSOCIATION; 2024 Jun p. 09-17 09-17.

Indexing: OpenAIRE, INTERNATIONAL Scientific Indexing, LetPub, INDEX COPERNICUS INTERNATIONAL, AEC

Keywords: Arachnoid granulations, Cerebrospinal fluid, Dural sinuses

Academic Editor: Dr Parmod Goyal

Correspondence:

Dr. Chaitanya Mittal

Assistant Professor, Department of Forensic Medicine & Toxicology,
Dr. B. C. Roy Multi-speciality Medical Research Centre (BCRMMRC),
Indian Institute of Technology Kharagpur,
Kharagpur-721302, West Bengal, India.

Email: chaitanmbbs@gmail.com

ORCID: orcid id: 0000-0002-1842-5627

Abstract

Arachnoid granulations are cerebrospinal fluid (CSF)-filled protrusions with meningothelial lining extending through a dural opening into the venous sinuses. These structures filter and drain the CSF into central venous circulation across a lining of arachnoid cells. Detection of defects in these regular fillings within intracranial dural sinuses decreases the erroneous diagnosis of the existence of an intrasinus pathological process. It is essential for clinicians as well as forensic pathologists to be aware of unusual intracranially morphologies existing, especially intrasinus arachnoid granulations, as it is significant for clinical diagnosis, accurate treatment, and even in the postmortem examination in determining the cause of death. This article aims to provide an overview of arachnoid granulations in the medical literature.

INTRODUCTION

Antonio Pacchioni initially described arachnoid granulations (AGs) more than 300 years ago [1]. Arachnoid granulations are outpouchings of the arachnoid meningeal membrane extending into the dural sinuses or calvarium, surrounded by dense connective tissue capsule, that allow the cerebrospinal fluid (CSF) absorption into the venous system from the space between Arachnoid and Piamater, i.e., subarachnoid space. Within dural sinuses, these appear as well-defined focal localized nodular, oblong, or rounded structures [2,3]. Arachnoid villi are microscopically visible, whereas arachnoid granulations representing distended villi are visible to the naked eye [4]. Its function is to drain CSF to the lower-pressured venous system. AGs grow in numbers and size with age in response to increased CSF pressure from the subarachnoid space. They usually measure a few

millimeters but may enlarge to penetrate the inner table of the skull, most commonly adjacent to the midline of the posterior frontal or anterior parietal area [5].

Literature Review

Age: In a study by Yew M et al., all subjects were older than 30 years, with 50% of subjects aged 55 years or older. The prevalence of AGs expanding into the temporal bone was twenty-eight percent among the subjects aged 50 years or above [6]. Autopsy-based studies on giant arachnoid granulations (GAGs), generally occurring as a rare incidental finding, are common in adults, especially in elders over 65 years of age [7]. GAGs in a 6-year-old girl child with benign intracranial hypertension are also reported [8].

Size: The average size of the AGs was 8.1 x 9.4 x 10.0 mm (ranging from 4 –19 mm) in a study pertaining to the dorsal superior sagittal sinus [9]. In the elderly, it can reach a remarkable size (up to 25 mm and more in diameter) [7].

Locations: AGs are primarily located beneath the superior sagittal sinus (SSS) and the venous lacunae in the parasagittal region and communicate with the SSS [2, 10]. In decreasing order of frequency, it is thought to be present maximum in the transverse sinus, then the cavernous sinus, the superior petrosal sinus, and least in the straight sinus [11]. Occasionally, they are also seen at the posterior portion of the temporal bone wall [12]. In a study by Yew M et al., AGs demonstrated a greater tendency to occur at the middle cranial fossa compared to the temporal bone's posterior cranial fossa surfaces. AGs were often found to enter the temporal bone at the tegmen mastoideum and tegmen tympani. Additionally, they were observed within the posterior view of the petrous pyramid, the internal auditory canal, and the cochlear aqueduct's inferior aperture at the jugular foramen's superior extent [6].

Diagnosis: The diagnostic proof of AG was the radiological appearance on multiple modalities with an unchanged appearance over the long term. A non-contrast computed tomography (CT) of the head executed to rule out intracranial hemorrhage disclosed a tubular and elongated lesion within the posterior SSS. Magnetic resonance imaging (MR) revealed the lesion resembling CSF appearance, i.e., hyperintense on T2-weighted MRI and hypointense without any appreciable enhancement on T1-weighted MRI. MRI also

demonstrated a T2-hypointense flow void above the lesion and vascular bundle entry into the neck of the lesion's superior end. In T2-weighted Fluid-attenuated inversion recovery (FLAIR) imaging, the lesion demonstrated suppression of signal similar to CSF [2]. AGs are generally hypointense but occasionally mild hyperintense compared with CSF without gadolinium enhancement [13]. A cerebral digital subtraction angiography disclosed bilateral non-flow signal focal areas protruding into both sinus's lumen at the transverse sinus-sigmoid sinus junction compatible with GAGs and left transverse sinus hypoplasia [14]. On high-resolution computed tomography (HRCT) of the temporal bone, AGs appeared as erosions in the wall of the posterior temporal bone, without any mass, often presented as a lobulated surface, and with an attenuation varying from CSF and brain tissue [12]. On high-resolution T2- T2-weighted images, a linear hypointense constituent of the internal fibrous structure of the AG can be visualized [10]. AGs in the cerebral dural sinuses can also be revealed in contrast-enhanced 3D MR venography.

In many cases, AG identification is facilitated by their characteristic appearances, i.e., oval or rounded-shaped, well-defined outlines with homogenous intensity. The cortical vein adjacent to it is considered a supplementary supportive element [15]. MRI evaluation of cerebral AGs in venous sinus using 3D T2 CUBE and 3D contrast-enhanced BRAVO sequence can also be demonstrated. MRI showed these entities as largely hypointense with CSF in T1, hyperintense with CSF in T2 sequences, isointense on FLAIR, hypointense on DWI, and seen as filling defects on BRAVO. Septations as linear variations of signal intensity were seen within the granulations. Altered MR signal intensity was noted occasionally when calcifications existed. The AGs disclose as filling defects at MR angiography (MRA). They appear elliptical on oblique MRA images [16].

Microscopy: Transmission electron microscopy analysis showed that the structure of AG has a reticular conglomerate with endothelial cells that resemble lymphatic linings. Immunohistochemistry and immunoelectron microscopy revealed the expression of molecules specific to lymphatic endothelial cells [17]. Scanning electron microscopy demonstrated the tridimensional architecture of the collagen element in the AGs. It revealed a pedicle, body, and apex,

surrounded by a capsule of connective tissue composed of collagen fiber bundles that line pores of different sizes and shapes. Tiny bundles line the smaller pores at the apical region of AG, and thicker bundles line the larger pores at the lateral regions. In the body, the bundles of collagen fibers compose a fibrous meshwork, and in some areas, these bundles have a circular orientation, forming pores similar to those found at the region of the capsule [18].

Histology: AGs observed in a study by Yew M et al. revealed the following histologic features: 1) consistent with typical arachnoid cells i.e. nests of small nucleated cells that are organized loosely or densely in a webby pattern with prominent extracellular channels: 2) an outer fibrous layer of AG lining the bony defect; 3) dura mater dehiscence placing the AG in direct contact with the bone; and 4) bone erosion to varying depths. Cells that line the AGs were often noticed clustered at the tips of AGs and were accompanied by concentric calcifications or psammoma. Cortical erosion was found in all cases, with about 50% of AGs penetrating air-filled spaces or marrow. Brain tissue accompanied AGs and was observed extending through the defects in the dura mater and into the bony defects [7].

Proteins: Arachnoidal cells on confluent cultures expressed Cytokeratin intermediate filaments and the intermediate filament protein vimentin. These cells also express a few cytoskeletal proteins and junctional proteins like connexin43 involved in the formation of gap junctions, desmosomes desmoplakin 1 and 2 (a structural protein that links the desmosome to intermediate filaments), epithelial-specific adherens junctions like E-cadherin, as well as tight junctions like zonula occludens 1. In particular, these junctional proteins may be essential for allowing the arachnoidal cells to regulate CSF outflow [19].

Complications: AGs and the lymphatic system have a role in the pathophysiology of idiopathic intracranial hypertension (IIH) by restricting the absorption of CSF from the venous system and or congestion and overflow of the glymphatic system [20, 21]. Presentation of symptoms of progressive bifrontal headaches with a GAG at posterior SSS is also noted [22]. An MRI study also observed AGs bulging into the sigmoid sinus, transverse sinus, straight sinus, and confluence sinuum [23].

Controversial entity: Brain herniation into arachnoid granulations (BHAGs) comprises a brain tissue herniation into a presumed preexisting AG in the calvarium, dural venous sinuses, and meningeal or diploic veins. Some BHAGs can possibly cause headaches, epilepsy, or increased intracranial pressure conditions like IIH or pseudotumor cerebri (PTC) [24]. A study conducted by 68 BHAG was observed, with increasing order of frequency, in occipital squama, transverse sinus, lateral lacuna of the SSS, and straight sinus, and the most frequent involvement of the cerebellar tissue in BHAG. Parenchymal signal and structural changes were demonstrated in 46% of BHAG, of which 100 % were cerebellar [25].

Protective Effect: AGs may have a protective effect against the development of shunt-dependent chronic hydrocephalus following aneurysmal subarachnoid hemorrhage [26].

Differential Diagnosis: It may be misdiagnosed for venous sinus thrombosis with risks of unnecessary anticoagulation, intravascular thrombolysis or thrombectomy, or invasive intracranial pressure monitoring [2]. Due to the elliptical shape of oblique MRA images, they could be mistaken for Thrombus [16]. On HRCT, differentiation should be initially made from papillary endolymphatic sac tumor. The characteristic CT appearance is an aggressive soft-tissue tumor mass eroding the surface of the posterior temporal bone at the endolymphatic sac location and containing bone spicules with a peripheral rim of calcifications [27, 28]. T1- and T2-weighted images are characterized by heterogeneous signal intensities with typically focal high T1 signal intensities due to hemorrhagic and proteinaceous components [27]. Broad differential diagnosis of giant AGs in the dural venous sinuses other than dural venous sinus thrombosis also include metastases, meningiomas, arachnoid cysts, calvarial osseous lesions, dermoids, epidermoids, and extra-axial hemangiomas, including the papillary endothelial hyperplasia [29, 30]. These lesions demonstrate a more aggressive appearance locally than AGs. Further, chondromatous tumors are situated more anteriorly in the temporal bone at the petro-occipital synchondrosis and chordoma at the petrous apex or in paraganglioma, more posteriorly at the jugular foramen [31]. Occasionally, AGs even penetrate the diploic space and eventually

expand into the outer table, mimicking osteolytic lesions [5].

Conclusion: Medical professional, as well as forensic pathologists, needs to be aware of unusual intracranial morphologies existing, particularly intrasinus arachnoid granulations, as it is significant for clinical diagnosis, accurate treatment, and even in the postmortem examination in determining the cause of death. It is essential to be aware of the variability in the presentation of AGs to correctly identify them and distinguish them from other dural sinus pathology. Further, the radiologist, neurosurgeon, and autopsy surgeon should know its existence because they can be incidentally noted. This distinction of arachnoid granulations can be brought up by meticulously considering its CT and MR imaging characteristics and other required diagnostic procedures.

Funding: This research did not receive any grant from funding agencies in public, commercial, or not-for-profit sectors.

Declaration of competing interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

References:

1. Brunori A, Vagnozzi R, Giuffrè R. Antonio Pacchioni (1665–1726): early studies of the dura mater. Journal of Neurosurgery. 1993;78(3):515-8.
2. Mamaliga T, Hadi M. An unusual vermiform giant arachnoid granulation. Radiology Case Reports. 2019;14(12):1525-8.
3. Chin SC, Chen CY, Lee CC, Chen FH, Lee KW, Hsiao HS, Zimmerman RA. Giant arachnoid granulation mimicking dural sinus thrombosis in a boy with headache: MRI. Neuroradiology. 1998;40(3):181-3.
4. Potts DG, Reilly KF, Deonarine V. Morphology of the arachnoid villi and granulations. Radiology. 1972;105(2):333-41.
5. Park SH, Park KS, Hwang JH. Arachnoid Granulations Mimicking Multiple Osteolytic Bone Lesions in the Occipital Bone. Brain Tumor Research and Treatment. 2018;6(2):68-72.
6. Yew M, Dubbs B, Tong O, Nager GT, Niparko JK, Tatlipinar A, Francis HW. Arachnoid granulations of the temporal bone: a histologic study of dural and osseous penetration. Otology & Neurotology. 2011 Jun 1;32(4):602-9.
7. Haybaeck J, Silye R, Soffer D. Dural arachnoid granulations and "giant" arachnoid granulations. Surgical and Radiologic Anatomy. 2008;30(5):417-21.
8. Park H, Lim GY, Eom TH. Giant arachnoid granulation in a child with benign intracranial hypertension: an unusual case. Child's Nervous System. 2018 Dec;34(12):2525-7.
9. Leach JL, Meyer K, Jones BV, Tomsick TA. Large arachnoid granulations involving the dorsal superior sagittal sinus: findings on MR imaging and MR venography. American Journal of Neuroradiology. 2008;29(7):1335-9.
10. Okamoto K, Ito J, Tokiguchi S, Furusawa T, Nishihara M. Arachnoid granulations of the posterior fossa: CT and MR findings. Clinical Imaging. 1997;21(1):1-5.
11. Leach JL, Jones BV, Tomsick TA, Stewart CA, Balko MG. Normal appearance of arachnoid granulations on contrast-enhanced CT and MR of the brain: differentiation from dural sinus disease. American Journal of Neuroradiology. 1996;17(8):1523-32.

12. VandeVyver V, Lemmerling M, De Foer B, Casselman J, Verstraete K. Arachnoid granulations of the posterior temporal bone wall: imaging appearance and differential diagnosis. American Journal of Neuroradiology. 2007;28(4):610-2.
13. Ikushima I, Korogi Y, Makita O, Yamura M, Kawano H, Kohama M, Arikawa K, Takahashi M. MRI of arachnoid granulations within the dural sinuses using a FLAIR pulse sequence. The British Journal of Radiology. 1999;72(863):1046-51.
14. Arjona A, Delgado F, Fernandez-Romero E. Intracranial hypertension secondary to giant arachnoid granulations. Journal of Neurology, Neurosurgery & Psychiatry. 2003;74(4):418.
15. Haroun AA, Mahafza WS, Al Najar MS. Arachnoid granulations in the cerebral dural sinuses as demonstrated by contrast-enhanced 3D magnetic resonance venography. Surgical and Radiologic Anatomy. 2007;29(4):323-8.
16. Singh B, Chauhan T, Mishra D. MR evaluation of cerebral Arachnoid Granulations in venous sinus using 3D T2 CUBE and 3D contrast-enhanced BRAVO sequence. IOSR Journal of Dental and Medical Sciences. 2022; 21,(1 Ser.15):1-7.
17. Kutomi O, Takeda S. Identification of lymphatic endothelium in cranial arachnoid granulation-like dural gap. Microscopy. 2020 Dec;69(6):391-400.
18. Conegero CI, Chopard RP. Tridimensional architecture of the collagen element in the arachnoid granulations in humans: a study on scanning electron microscopy. Arquivos de neuro-psiquiatria. 2003;61:561-5.
19. Holman DW, Grzybowski DM, Mehta BC, Katz SE, Lubow M. Characterization of cytoskeletal and junctional proteins expressed by cells cultured from human arachnoid granulation tissue. Cerebrospinal fluid research. 2005;2(1):1-2.
20. Kan P, Stevens EA, Couldwell WT. Incidental giant arachnoid granulation. American Journal of Neuroradiology. 2006;27(7):1491-2.
21. Watane GV, Patel B, Brown D, Taheri MR. The significance of arachnoid granulation in patients with idiopathic intracranial hypertension. Journal of Computer Assisted Tomography. 2018;42(2):282-5.
22. Mondejar V, Patsalides A. The role of arachnoid granulations and the glymphatic system in the pathophysiology of idiopathic intracranial hypertension. Current Neurology and Neuroscience Reports. 2020;20(7):1-6.
23. Tsutsumi S, Ono H, Ishii H. Arachnoid granulations bulging into the transverse sinus, sigmoid sinus, straight sinus, and confluens sinuum: A magnetic resonance imaging study. Surgical and Radiologic Anatomy. 2021;43(8):1311-8.
24. Ciochon UM, Sehested PC, Skejø HP, Miehe J, Nørgaard I, Shekhrajka N. The controversial entity of brain herniations into arachnoid granulations: A report of three cases with literature review. Radiology Case Reports. 2021;16(9):2768-73.
25. Malekzadehlashkariani S, Wanke I, Rüfenacht DA, San Millán D. Brain herniations into arachnoid granulations: about 68 cases in 38 patients and review of the literature. Neuroradiology. 2016;58(5):443-57.
26. Almohaimede K, Zaccagna F, Kumar A, da Costa L, Wong E, Heyn C, Kapadia A. Arachnoid granulations may be protective against the development of shunt dependent chronic hydrocephalus after aneurysm subarachnoid hemorrhage. medRxiv. M*edRxiv.* 2021. Preprint. DOI: 10.1101/2021.12.25.21268402.
27. Mukherji SK, Albernaz VS, Lo WW, Gaffey MJ, Megerian CA, Feghali JG, Brook A, Lewin JS, Lanzieri CF, Talbot JM, Meyer JR. Papillary endolymphatic sac tumors: CT, MR imaging, and angiographic findings in 20 patients. Radiology. 1997;202(3):801-8.
28. Patel NP, Wiggins III RH, Shelton C. The radiologic diagnosis of endolymphatic sac tumors. The Laryngoscope. 2006 Jan;116(1):40-6.
29. Grossman CB, Potts DG. Arachnoid granulations: radiology and anatomy. Radiology. 1974;113(1):95-100.
30. Peters SA, Frombach E, Heyer CM. Giant arachnoid granulation: differential diagnosis of acute headache. Australasian Radiology. 2007;51:B18-20.
31. Bonneville F, Sarrazin JL, Marsot-Dupuch K, Iffenecker C, Cordoliani YS, Doyon D, Bonneville JF. Unusual lesions of the cerebellopontine angle: a segmental approach. Radiographics. 2001;21(2):419-38.

Picture A: Showing Gross image of Brain with Arachnoid Granulations in a case of sudden death of 50-year-old male

Picture B: Showing Gross image of Brain with adherent Arachnoid Granulations in a case of electrocution of 30 year old male

Arjun Mourya [2024]. International Journal of Medical Justice, IJMJ, Volume 2, Issue 1: January-June 2024 [E-ISSN: 2583-7958]
International ISSN [CIEPS]: 3006-208X[Print] 3006-2098[Online]
Content list Available at ijmj.net

International Journal of Medical Justice

Journal Homepage: https://www.ijmj.net

Original Research:

A study on Postmortem cases of natural and unnatural death at NSCGMC Khandwa M.P.

Arjun Mourya*, Seema Sutay** , Ashok Najan*** , Usharani Dussa*

* Postgraduate Resident, **Professor and Head, ***Associate professor, Department of Forensic Medicine and Toxicology, Nandkumar Singh Chouhan Government Medical College Khandwa, Madhya Pradesh.

Article History:

Date of Submission: Sunday March 17, 2024

Date of Start of Review Process: Monday March 18, 2024

Date of Receipt of Reviewers Report: Monday March 25, 2024

Date of Revision: Tuesday March 26, 2024

Date of Acceptance: Tuesday April 02, 2024

Date of Publication: Sunday June 30, 2024

Digital Object Identifier **[DOI]**: https://doi.org/10.5281/zenodo.12600763

Available Online: Sunday June 30, 2024

Website Archive: https://www.ijmj.net/archive/2024/1/IJMJ-2024-218.pdf

Citation: 1. Arjun M, Seema S, Ashok N, Usharani D. A study on Postmortem cases of natural and unnatural death at NSCGMC Khandwa M.P. International Journal of Medical Justice. 2024Jun30;2(1):18-26.

Indexing: OpenAIRE, INTERNATIONAL Scientific Indexing, LetPub, INDEX COPERNICUS INTERNATIONAL, ACJ

Keywords: Autopsy, police inquest, Khandwa, descriptive observational study, natural and unnatural.

Academic Editor: Dr Richa Gupta

Arjun Mourya [2024]. International Journal of Medical Justice, IJMJ, Volume 2, Issue 1: January-June 2024 [E-ISSN: 2583-7958] International ISSN [CIEPS]: 3006-208X[Print] 3006-2098[Online]

Correspondence:

Dr. Seema Sutay

Professor and Head, Department of Forensic Medicine & Toxicology, Nandkumar Singh Chouhan Government Medical College Khandwa, Madhya Pradesh, INDIA

Email: drseemasutay@gmail.com

ORCID: https://orcid.org/0000-0001-8836-8958

Abstract

This study investigates patterns observed in the postmortem examinations of both natural and unnatural deaths at NSC GMC Khandwa. The analysis includes an examination of age groups, the female-to-male ratio, causes of death, and their respective percentages concerning natural and unnatural deaths. Conducted as a retrospective study, this research is based on records of medico-legal autopsies performed in the mortuary at the Department of Forensic Medicine and Toxicology, Medical College and Hospital, Khandwa. The study covers a three-year period from April 1st, 2020, to March 31st, 2023.Out of the total deaths, 93% were classified as unnatural deaths, while 7% were attributed to natural causes. The male-to-female ratio was found to be 4.31:1. Poisoning emerged as the leading cause of unnatural deaths, followed by road traffic accidents. In the case of natural deaths, heart disease was identified as the most common cause.

Introduction: This study aims to examine patterns in postmortem findings for both natural and unnatural deaths. Natural causes typically result from disease or old age, whereas unnatural causes stem from external factors such as accidents, violence, poisoning, or suicide [1]. In recent years, there has been a notable increase in suicide cases, with poisoning being a more prevalent cause compared to other suicide methods. The ready availability of various pesticides in today's times contributes to this trend.

The contemporary landscape witnesses an elevated incidence of suicides as a method of death, with poisoning featuring prominently. This surge is attributed to the

ready availability of different types of poisons. In the context of unnatural deaths, the term is applied when a demise occurs prematurely against the natural order, resulting from injury, position, or other violent means [2].

Death is further categorized as sudden or expected. Sudden death is defined when a person, not known to have been suffering from any dangerous disease, injury, or poisoning, is found dead or dies within 24 hours after the onset of a terminal illness [4]."

Objective

1. Investigate the causes of both natural and unnatural deaths at NSCGMC Khandwa.
2. Determine the male-to-female death ratio.
3. Analyse the distribution of cases based on age.

Material and method

Study Setup: This study was conducted at the Department of Forensic Medicine and Toxicology, NSC Govt Medical College, Khandwa (Madhya Pradesh).

Study Duration: April 1, 2020, to March 31, 2023 (3 years).

Study Design: Descriptive observational study.

Material: All data from autopsied cases at the mortuary of NSCGMC Hospital, Khandwa during the study period were included in the study, provided they met the inclusion and exclusion criteria.

Inclusion Criteria:

- All cases of natural and unnatural deaths brought to the mortuary for post-mortem, along with police inquest.

Exclusion Criteria:

- Deaths not recorded in police records.
- Cases of unnatural and natural deaths where written information was not provided by family members.
- Cases of unnatural and natural deaths received and handed over without post-mortem examination.

Result and observation

During the study period, there were a total of 1364 medico-legal autopsies conducted at the mortuary. Of these, 1263 (93%) were categorized as unnatural deaths, and 101 (7%) were classified as natural deaths. The distribution by gender revealed 257 (18.84%) females and 1107 (81.15%) males, indicating a male-to-female ratio of 4.3:1. The highest number of natural and unnatural deaths occurred in the 4th decade of life, followed by the 3rd, 5th, 2nd, and

6th decades, with the age group of 21–40 years being the most involved (see Fig 1). A pie chart (Fig 2) illustrates the composition of the total autopsies, emphasizing that 93% were unnatural deaths.

Fig 1-Age and sex wise distribution death [Please refer to Figure 1 on last page]

Fig 2- Pie graph % of natural and un natural death [Please refer to Figure 2 on last page]

Among the causes of death, poisoning accounted for the highest number, with 378 cases, followed by 295 cases due to road traffic accidents (RTA) (see Table 1).

Within the category of natural deaths, the highest percentage was attributed to cardiac causes (36.66%), followed by respiratory deaths (23.76%), alimentary issues (22%), and then central nervous system (CNS) related deaths (18%) (refer to Table 2).

Additionally, during the study, it was observed that post-March 2021, the surge in Covid virus infections led to a decline in the rate of post-mortem examinations. Consequently, the number of post-mortem examinations in the years 2021 and 2022 decreased (see Fig 3).

The pie graph (Fig 4) illustrates that the majority of individuals included in this study were employed in the private sector, predominantly as laborers, followed by students and housewives. Occupational status was not applicable in 16 cases due to their low school age. The distribution of cases revealed that a significant proportion of both natural and unnatural deaths were from urban areas, as the study specifically focused on Khandwa and its surrounding regions. Furthermore, over 46% of the study population belonged to the literate sections of society.

This study was conducted to analyse the pattern of unnatural deaths in Khandwa region. The forensic autopsies of Khandwa included post-mortem cases in ascending order of natural deaths in Khandwa from April 2020 to March 2023, analysing the circumstances surrounding the death from police reports and clinical report data. This study was done keeping in mind all types of diseases that cause deaths, and who were brought to the mortuary for postmortem. The year-wise incidence gradually increased from total deaths. During the study, it was also found that after

March 2021, due to the increase in Covid virus infection and the implementation of new guidelines, the rate of post-mortem examination had also declined, hence the number of post- mortem examinations in the year 2021 and 2022 were less.In 2023, with a decrease in Covid virus infections, there was a resurgence in post-mortem examinations. The areas involving police inquest situations witnessed a subsequent increase, as depicted in Figure 5.

Discussion: In this study, poisoning emerged as the most prevalent finding, consistent with earlier research. Deaths attributed to poisoning continue to constitute a significant global health burden [3]. The primary poisons consumed include pesticides, insecticides, and rat poison (organophosphate and aluminium phosphide), owing to their easy accessibility.". "India is often referred to as an agricultural country, where various types of pesticides are extensively utilized in farming, as demonstrated in previous studies. Given the country's agriculture-centric nature and the pursuit of maximum yield from the fields, farmers employ a diverse range of pesticides and insecticides. This practice, however, leads to an increased risk of direct or indirect exposure to these chemicals [5]."

Out of the 378 cases of poisoning, constituting 27% of the total, only 2 cases were attributed to accidental poisoning. In the current study, approximately 48% of the cases involved unnatural deaths with a suicidal nature, the majority of which (29.92%) were due to poisoning "The age group predominantly affected is 21 to 30 years, in alignment with findings from previous studies [5]. Interestingly, this study reveals a higher incidence of suicide by poisoning compared to other studies. Hanging, at 77%, emerges as the most prevalent method across all age groups, constituting 49% of male suicides and 28% of female suicides. Poisoning follows at 20%, with both methods collectively accounting for 97% of the cases [6]."

In approximately 9% of cases, alcohol was detected alongside poison. The male-to-female ratio is 4.3:1, deviating from findings in other studies [7]. Examining various modes of death, suicides account for 47.66%, accidents for

28.58%, homicides for 1.97%, and undetermined causes for 17.57%, which contrasts with other reports [7]. Variations may occur in unknown cases as the cause of death is determined during forensic investigations. Cases sent from Khandwa mortuary to the forensic lab often have pending reports, resulting in a higher number of unknown cases. Road traffic accidents make up 23.35%, totaling 295 cases, with 107 involving females. The male-to-female ratio in these accidents is 2.8, and 63.72% involve men.

This study observed a higher incidence of suicides, with hanging being the third most common method, considered a prevalent and painless form of death [8]. The total deaths by hanging in unnatural deaths were 162 (12.82%), significantly higher than reported in other states [7]. Other causes of death include drowning (4.5%), train accidents (2.6%), burns (0.74%), falls, and electric shocks. Approximately 1.5% of deaths were due to murders. Among natural deaths, the majority involved sudden cardiac death (37%), followed by respiratory system issues (24%), alimentary system issues (22%), and central nervous system issues (18%).

Out of the 1364 cases, 257 (18.15%) were females, and 1107 (85.15%) were males. Males outnumbered females in every age group, with the 21-40 age group being more involved. The study showed that the age group of 20-50 years was most affected, comprising about 70% of the study population. These are active years of human life, involving various physical activities [2].

Conclusion: Over the past three years, NSC GMC Khandwa conducted autopsies on a total of 1364 cases, encompassing both natural and unnatural deaths. Unnatural deaths accounted for the majority at 93%, surpassing natural deaths which constituted 7%. Among unnatural deaths, suicides were the most prevalent, with poisoning identified in 27% of cases. In the category of natural deaths, heart disease emerged as the leading cause, representing 37% of the total."

References:

1. AED Attorneys. What does it mean if the death certificate says unnatural causes specific to reporting the estate? [Internet]. Heldekruin: AED Attorneys; 2024 [cited 2024 Jun 1]. Available from: https://adattorneys.co.za/what-does-it-mean-if-the-death-certificate-

says-unnatural-causes-specific-to-reporting-the-estate/#:~:text=Natural%20causes%20are%20those%20that,%2C%20bicycles%2C%20pedestrians%2C%20or%20animals

2. Meena PR, Puniya RK. Socio-demographic profile of unnatural death: An autopsy based study at SMS Medical College, Jaipur. J Indian Acad Forensic Med. 2016 Apr-Jun;38(2):160.

3. Barman DD, Nair GVK, Karna Boopathy R. Study of the trend of poisoning in a tertiary care hospital in Chidambaram, Tamilnadu. J Indian Acad Forensic Med. 2017 Jan-Mar;39(1):22.

4. Memchoubi Ph, Meera Devi Th, Thongam Dolly. A study of sudden natural death in Imphal from 2010-2014. J Indian Acad Forensic Med. 2016 Apr-Jun;38(2):167.

5. Verma P, Nigam M, Kulkarni R, Mishra PK, Misara P. Pesticides: Our friends or foe. J Indian Acad Forensic Med. 2018 Jan-Mar;40(1):47.

6. Shankar Udaya BS, Sujatha PL, Shivkumar BC. Profile of suicide amongst autopsies at a tertiary care center in Bangalore North. J Indian Acad Forensic Med. 2018 Jan-Mar;40(1):43.

7. Rao RG, Jakkam S, GK V, Prasad SRKG. An analytical study of unnatural deaths in Kakinada area: One year retrospective study. J Indian Acad Forensic Med. 2016;38(3):304.

8. Vaishnawa NK, Sharma S, Joshi MP, Jugtawat J, Vyas PC. Study of epidemiological profile of hanging in Jodhpur region of Rajasthan: An autopsy based study. J Indian Acad Forensic Med. 2016;38(3):306.

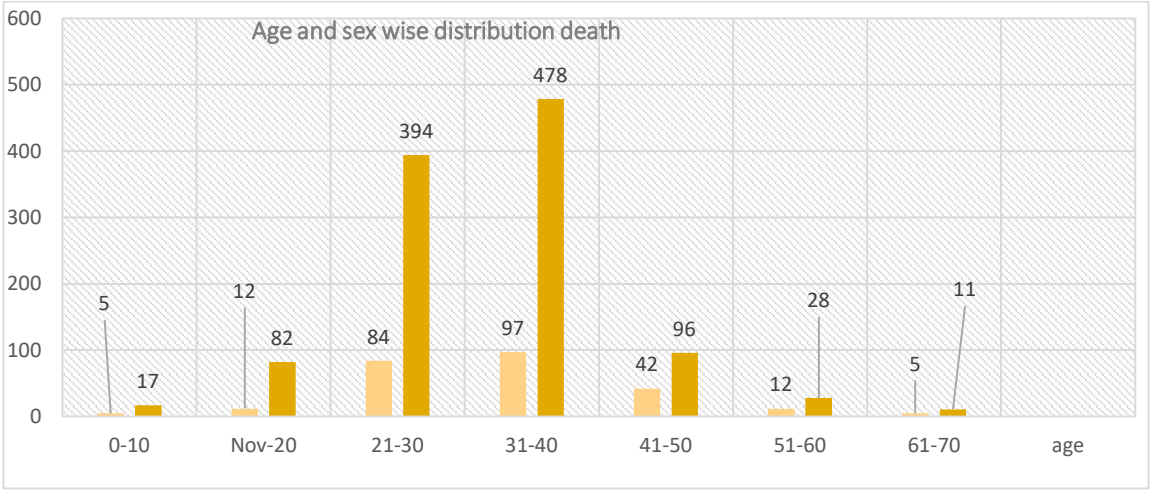


Figure 1-Showing Age and sex wise distribution death

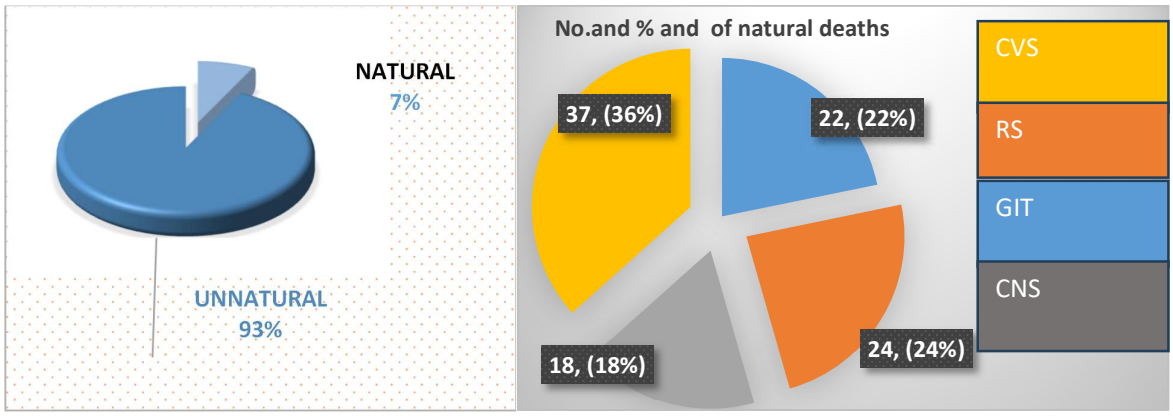
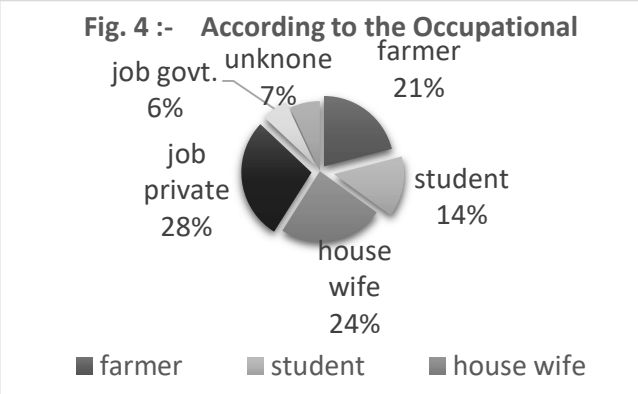


Figure 2 and 3: Showing pie graph % of natural and un natural death and Percentage of Causes of Natural Deaths.



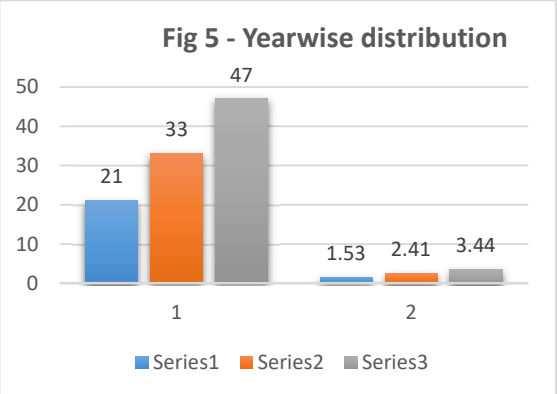


Table 1 and 2: Showing Pattern of Various causes of death.

Unnatural Cause of death	suicidal	homicidal	accidental	unknown	Total
Death due to Poisoning	378	0	2	1	381
Death due to road traffic accident	0	0	295	0	295
Death due to hanging	162	1	0	1	164
Death due to drowning	62	0	9	0	71
Death due to railway injuries	36	0	2	4	42
Death due to burn/thermal injuries	10	5	13	4	32
Death due to trauma blunt/sharp, or assaults injuries	5	19	0	2	26
Death due to lightening and electricity	0	0	20	0	20
Death due to snake bite	0	0	19	0	19
Death due to fall from height	2	0	1	0	3
Death due to any other circumstances of death	0	0	0	210	210
Total	**602 (47.66%)**	**25 (1.97%)**	**361 (28.58%)**	**222 (17.57%)**	**1263**

Natural deaths	number
GIT (liver disease)	22
Respiratory (T.B, pneumonia, pneumonitis)	24
CNS(intraventricular ,subdural hemorrhage)	18
Death due to cardiac failure/arrest	37
Total	101

Mamta Kumari [2024]. International Journal of Medical Justice, IJMJ, Volume 2, Issue 1: January-June 2024 [E-ISSN: 2583-7958]
International ISSN [CIEPS]: 3006-208X[Print] 3006-2098[Online]
Content list Available at ijmj.net

International Journal of Medical Justice

Journal Homepage: https://www.ijmj.net

Scientific Correspondence:

Breaking bad news to patient/attendants: A Medical Dilemma

Mamta Kumari*, Mandeep** ,Gaurav Sharma**, Vijay Pal Khanagwal***, Kunal Khanna****, Sandeep Giri*****, Tarun Dagar*****

* Senior Resident, **Postgraduate Resident, ***Professor and Head, ***Associate professor, *****Assistant Professor

Department of Forensic Medicine and Toxicology, Kalpana Chawla Govt. Medical College, Karnal, India

Article History:

Date of Submission: Wednesday May 1, 2024

Date of Start of Review Process: Friday May 3, 2024

Date of Receipt of Reviewers Report: Saturday May 25, 2024

Date of Revision: Friday May 31, 2024

Date of Acceptance: Saturday June 1, 2024

Date of Publication: Sunday June 30, 2024

Digital Object Identifier **[DOI]**: https://doi.org/10.5281/zenodo.12600870

Available Online: Sunday June 30, 2024

Website Archive: https://www.ijmj.net/archive/2024/1/IJMJ-2024-219.pdf

Citation: 1. Mamta K, Mandeep, Gaurav S, Vijay Pal K, Kunal K, Sandeep G, et al. Breaking bad news to patient/attendants: A Medical Dilemma. International Journal of Medical Justice

Indexing: OpenAIRE, INTERNATIONAL Scientific Indexing, LetPub, INDEX COPERNICUS INTERNATIONAL, ASCI

Keywords: Bad News, Communication, SPIKES, Client-centered, Counselling

Academic Editor: Dr Afzal Haroon

Mamta Kumari [2024]. International Journal of Medical Justice, IJMJ, Volume 2, Issue 1: January-June 2024 [E-ISSN: 2583-7958] International ISSN [CIEPS]: 3006-208X[Print] 3006-2098[Online]

Correspondence:

Dr. Vijay Pal Khanagwal

Professor and Head, Department of Forensic Medicine & Toxicology,

Kalpana Chawla Govt. Medical College, Karnal, India

Email: drvijaykhanagwal@yahoo.co.in

ORCID:

Abstract: Any information given to the patients or their relatives that drastically changes their mental state or emotions, is considered as a bad news. Breaking bad news properly is an essential skill for all healthcare professionals as the same may be required to be repeated multiple times during their professional careers. This is a negotiation process between the doctor and the patient, but for a diversity of reasons, doctors frequently find it challenging. They are apprehensive of provoking a bad response from the patient or their family members and may feel uncomfortable. For the most part, doctors and other healthcare professionals, inadequate training in delivering unpleasant news is considered as a handicap in their medical practice. Developing this talent requires adherence to the client-centered counselling tenets. In this paper, the authors analyse the forward a six-step SPIKES protocol, as a systematic and easy communication strategy for breaking bad news. Gaining proficiency in handling challenging circumstances offers beneficial therapeutic effects and is a fulfilling career path.

Keywords: Bad News, Communication, SPIKES, Client-centered, Counselling.

Introduction:

Communication is a human capability that can be improved through interaction and training as an essential skill. Establishing effective and good communication reduces stress and increases satisfaction among the recipients of health services. This effective communication helps the patient to be aware of the ailment and treatment options which then help them to make the right decision. One of the most important aspects of communication in the healthcare system is the process of breaking bad news.[1] As a healthcare service provider,

the medical professionals aim to provide the best possible medical healthcare to the patients as per their clinical skills and knowledge. Across different cultures, doctors and health care professionals have been equated to a God-like entity since time immemorial, who provide hope to the despondent patient for a better and healthy future. When a patient approaches a doctor for treatment of his illnesses, he comes with the expectation that he will be cured of his disease and resume a healthy lifestyle soon. However, sometimes the diagnosis or the prognosis of the disease may have antagonistic information which in common terminology may be called a bad news. It is defined as one which is pertaining to a situation where there is a feeling of no hope, a threat to a person's mental or physical well-being, a risk of upsetting an established lifestyle, or where a message is given that conveys to an individual fewer choices in his or her life. In context of The Indian society where the family is still a close-knit unit compared to the West, various family members react differently to an adverse news.[2] Another definition states that "any news that drastically and negatively alters the patient's view of her or his future" is a bad news.[3] Disclosure of any adverse information not only hurts the patient and their relatives but also puts the healthcare worker in an uncomfortable situation. Several empirical studies have documented the physician-patient communication as suboptimal. The main causes for physician's avoidance of the task of breaking bad news may be lack of skills or the hesitancy to deal with the patient's feelings.[4] Breaking bad news is a balancing act that requires clinicians to adapt continually to different factors such as their relationships with the patient, the patient's family, the institutional and systemic environment, and the cultural background.[5] Some literature has shown a significant difference between patient's and physician's preferences on the ways to break bad news. In addition, these studies have indicated that most clinicians found this task a complex communication skill and they had much difficulty telling the truth to their patients, so they strongly felt the need for training on this important issue.[6] Despite the availability of an extensive body of research and online resources, communication lacunae pose hurdles in cultivating good therapeutic relationships. One of the most successful approaches to breaking bad news

is through client-centered counselling, as proposed by Karl Rogers. He put forward three points to achieve a growth-producing therapeutic relationship between the client (the patient) and the counsellor (the physician). They are (1) be genuine and congruent, (2) offer unconditional positive regard, and (3) feel and communicate a deep, empathetic understanding.[7] A patient-centered communication style has the most positive outcome for receivers of bad news on a cognitive, evaluative and emotional level. The physician's attitude and how he conveys the important news is exceptionally pivotal for the patient. A cool, detached posture of true professionalism would be viewed by the patient as well as their relatives as evasive, cold, and unsympathetic at just the time that they are in much need of empathy and support may prove counterproductive.[4] The doctor should not use any blocking behaviors to immunize himself from the potential distress that he may not be able to handle. Some of the blocking behaviors include giving advice and reassurances too soon before addressing the patient's primary concerns, portraying the patient's distress as normal, downplaying the issues, changing the subject of the conversation, and making inappropriate jokes.[8]

What are the barriers to breaking bad news?

Breaking bad news can take a heavy emotional burden on the doctor, he often feels burdened by negative news and anticipates negative reactions. The common barriers faced by doctors for breaking bad news may be enumerated as:[9]

1. The patient's expectations are unknown to the doctor
2. The doctor fears that he might be annihilating the expectation of the patient
3. The doctor may fear that he may not be adequately capable of dealing with any untreatable disease.
4. The doctor may be concerned that he will be unable to control his emotions after telling the patient.
5. The doctor might have presented an overoptimistic picture of the patient's condition in the past and this may be causing embarrassment in the current situation where he needs to break the bad news

The healthcare team should be prepared to deal with a wide range of emotional outbursts when the news of a sudden death comes. Every person's grief response is unique and will be different from one person ranging from initial shock reaction; to denial, proceeding

to anger, guilt and later on acceptance of the condition.[10]

Many protocols have been used in the healthcare system to deliver bad news to patients or patient's relatives, however SPIKES model is most prevalent.

BOX 1:

1. SPIKES PROTOCOL

S- Setting up interview

P- Assessing patient's perception

I- Obtaining the patient invitation

K-Giving knowledge and information to the patient

E- Addressing the patient's emotions with empathetic response

S- Strategy and summary

Well-established SPIKES Protocol described by Walter F. Baile , for disclosing unfavourable information or bad news. Pertaining to clinical practice but we will discuss how we can implement the steps in forensic medicine settings.

Step 1: SETTING UP the interview:
First decide what to say, where to say, whom to say and how to say.
The aim of this is to get the physical context right by maximizing the privacy, avoiding any unnecessary interruptions, to help patients to listen, understand and respect confidentiality.

Step 2: Assessing the patient's PERCEPTION:
Finding out how much the patient knows. The style and emotional content of the patient's statements provide you with information. Terms that are used or avoided and tone of voice will
give information about the patient's level of understanding and whether the implications of the
information have been taken in. It is important to learn the patient's level of understanding and
articulation so that the professional can later begin the information-giving at the same level. In our practice, this is the most important step as more often than not, the relatives of the patient are agitated and are in need of an answer from the investigating agencies are more than eager to direct them towards the doctor for their queries and concerns.

Step 3: Obtaining the patient's INVITATION:
Finding out how much the patient wants to know. In any conversation about bad news the real issue is not "do you want to know?" but "at what level do you want to know?"
A skilful communicator deals sensitively with such situations. In our field, divulging all the
details to near and dear ones may lead to unforeseen

circumstances which may have larger repercussions.

Step 4: Giving KNOWLEDGE and information to the patient:

Giving information to the relatives gradually while observing their reaction and in a language that the recipient may understand. Listen to their concerns and queries and respond accordingly.

Step 5: Addressing the patient's EMOTIONS with empathic responses:

Do not argue. Allow expression of emotion without criticism. Especially important while dealing with agitated crowd and one I feel we as a fraternity need to work on.

Step 6: Strategy and Summary

The aforementioned 6 steps may be developed for clinical practice set-up but as we can see that the core concepts are somewhat similar, however, execution may vary depending upon the set up.[11]

Application of SPIKES protocol for delivering bad news in forensic medicine setting:

Medicine deals with this issue more frequently than we assume, however, a major difference is that the news we provide by a forensic medicine expert are often different than the breaking bad news to cancer or chronically ill patients. More often the bad news is delivered to the near and dear ones of the deceased which is not always the case in clinical specialties where the patient may himself/herself may be the first one to receive the news. Rarely, examination of survivors of some form of sexual abuse presents an opportunity where we may have to deal with the person concerned directly. Citing a few examples from our own experiences where the autopsy surgeon may be the bearer of bad news:

- Parents discovering about unknown pregnancy in their child during autopsy.
- Breaking news of sexual assault of the deceased based upon the findings of post mortem examination.
- Dowry deaths.
- Deaths involving drugs and alcohol
- Sudden death of a young person, presumed healthy.
- Custodial deaths and deaths due to police action such as encounter etc.
- Cases where claims of compensation have been made.

Conclusion:

The act of kindness by healthcare professionals shown during the hour of need will help to strengthen the doctor-patient relationship further. The family will undoubtedly value the commitment of the healthcare team regardless of the outcome. In view of improving the skills of the professional, there should be conduction of workshops, viewing videotaped interactions between clinicians and simulated bereaved relatives, and small group role-plays could be efficient methods to teach clinicians how to break bad news

in the stressful environment of an emergency room.

References:

1. Jalali R, Jalali A, Jalilian M. Breaking bad news in medical services: a comprehensive systematic review. Heliyon. 2023;e14734:1-10.
2. Ptacek JT, Eberhardt TL. Breaking bad news: A review of the literature. JAMA. 1996;276:496-502.
3. Buckman R. Breaking bad news: Why is it still so difficult? BMJ. 1984;288:1597-9.
4. Narayanan V, Bista B, Koshy C. 'BREAKS'protocol for breaking bad news. Indian J of Palliative Care. 2010;16(2):61-5.
5. Bousquet G, Orri M, Winterman S, Brugière C, Verneuil L, Revah-Levy A. Breaking bad news in oncology: a metasynthesis. J Clin Oncol. 2015;33(22):2437-43.
6. Seifart C, Hofmann M, Bär T, Knorrenschild JR, Seifart U, Rief W. Breaking bad news–what patients want and what they get: evaluating the SPIKES protocol in Germany. Annals of Oncology. 2014;25(3):707-11.
7. Rogers CR. Foundations of the person centred approach. Education. 1979;100: 98-107.
8. Baile WF, Buckman R, Lenzi R, Glober G, Beale EA, Kudelka AP. SPIKES-A six-step protocol for delivering bad news: Application to the patient with cancer. Oncologist 2000;5:302-11.
9. Taylor KM. 'Telling bad news': physicians and the disclosure of undesirable information. Sociology of Health & Illness. 1988;10(2):109-32.
10. Naik SB. Death in the hospital: Breaking the bad news to the bereaved family. Indian J Critical Care Med. 2013;17(3):178-81.
11. Chand S. Essentials of Forensic Medicine and Toxicology: Essentials of Forensic Medicine and Toxicology. 2nd edition. Kundli. Elsevier Health Sciences; 2023:p.51.

Usharani Dussa [2024]. International Journal of Medical Justice, IJMJ,
Volume 2, Issue 1: January-June 2024 [E-ISSN: 2583-7958]
International ISSN [CIEPS]: 3006-208X[Print] 3006-2098[Online]
Content list Available at ijmj.net

International Journal

of Medical Justice

Journal Homepage: https://www.ijmj.net

Scientific Correspondence:

Deciphering Tools for Postmortem Analysis: Unveiling the Instruments of Investigation.

Usharani Dussa*, Seema Sutay**, Ashok Najan, Arjun Mourya

* Postgraduate Resident, **Professor and Head, ***Associate professor,

Department of Forensic Medicine and Toxicology, Nandkumar Singh Chouhan Government Medical College Khandwa, Madhya Pradesh.

Article History:

Date of Submission: Sunday March 17, 2024

Date of Start of Review Process: Monday March 18, 2024

Date of Receipt of Reviewers Report: Monday March 25, 2024

Date of Revision: Tuesday March 26, 2024

Date of Acceptance: Tuesday April 02, 2024

Date of Publication: Sunday June 30, 2024

Digital Object Identifier **[DOI]**: https://doi.org/10.5281/zenodo.12600915

Available Online: Sunday June 30, 2024

Website Archive: https://www.ijmj.net/archive/2024/1/IJMJ-2024-220.pdf

Citation: 1. Usharani D, Seema S, Ashok N, Arjun M. Deciphering Tools for Postmortem Analysis: Unveiling the Instruments of Investigation. International Journal of Medical Justice. 2024Jun30;2(1):34-53.

Indexing: OpenAIRE, INTERNATIONAL Scientific Indexing, LetPub, INDEX COPERNICUS INTERNATIONAL, ACJ

Keywords: autopsy, instruments, post-mortem

Academic Editor: Dr Chaitanya Mittal

Usharani Dussa [2024]. International Journal of Medical Justice, IJMJ, Volume 2, Issue 1: January-June 2024 [E-ISSN: 2583-7958] International ISSN [CIEPS]: 3006-208X[Print] 3006-2098[Online]

Correspondence:

Dr. Seema Sutay

Professor and Head, Department of Forensic Medicine & Toxicology, Nandkumar Singh Chouhan Government Medical College Khandwa, Madhya Pradesh, INDIA

Email: drseemasutay@gmail.com

ORCID: https://orcid.org/0000-0001-8836-8958

Abstract:

Post-mortem instruments play a crucial role in the autopsy process, aiding in the examination of a corpse to determine the cause and manner of death, and identify potential diseases or injuries. The evolution of post-mortem instruments has introduced new tools that enhance the ease and comfort of the autopsy procedure, replacing some older instruments. This review paper aims to collect and compile information on both new and old post-mortem instruments, providing insights into their uses, advantages, and disadvantages. Recognizing the lack of dedicated reference material for undergraduate and postgraduate students on this subject, this review serves as an attempt to gather essential information and cover various aspects of postmortem instruments.

Introduction: An autopsy stands as a specialized surgical procedure crucial for determining both the cause and manner of death. Autopsy instruments, specifically designed devices, play an integral role in executing the autopsy process. Over time, these instruments have been crafted from a variety of materials, including bronze, ivory, iron, and silver. Modern advancements have introduced new materials such as stainless steel, chrome, titanium, and vanadium. Stainless steel, comprising chromium, iron, carbon, nickel, magnesium, silicon, molybdenum, and sulfur [12], has become the predominant material for manufacturing these instruments. Similar to surgical instruments, autopsy instruments

are tailored for specific tasks, contributing to effective dissection and prolonging their functional lifespan. Given the multiple risks associated with working in a postmortem room, selecting the right instruments is crucial to minimizing these risks. Despite the importance of autopsy instruments, there is a notable lack of comprehensive information available to undergraduates and postgraduates. This paper addresses this gap by compiling a comprehensive list of autopsy instruments, offering a valuable resource for easy understanding and reference.

Classification of Postmortem instruments:

In order to perform postmortem, team needs a number of postmortem instruments. Each of the instruments use is designed for a specific function. They can be classified depending on use as follows:

1. Dissecting instruments

A) Scalpel with blade: Bard parker handle, the handle is made of metal (reusable) or plastic (disposable); blades are disposable, of various shapes and sizes.(10 to 24 sizes).

A.1.Scalpel: The scalpel blade has a slot - larger at its base and narrower at its top. The larger part is fitted to the groove of the handle, and the narrower part secures the blade into the groove.

A.2.Blades: they are available in variable sizes and they are disposable, the disposable blade is usually a 22 size, which is the largest commonly available. These Used to give incision, fine dissection and fascia reflex. Can dissect deep structures.**[11]**

[11]

B) Knives: There are various types of knives.

B.1.Cartilage knife, B.2. Resection knife, B.3. Organ knife, B.4. Brain knife B.5. Bistoury.B.1.Cartilage knife: the length of the blade is available in 133mm and 101 mm. it is a solid forged (the process of heating, deforming, and finishing a piece of metal).

With this specialized surgical tool, cartilage grafts with thicknesses varying from 0.1 to 0.7 mm can be cut.This is how the cartilages are sliced. They make quick, fluid cuts through cartilaginous regions. They have a German stainless body with sturdy, sharp blades.**[9]**

[3]

B.2. Resection knife: The Resection Knife Solid Handle is used for clearing out parts of tissues in postmortem and amputations. It has a 6.5 cm small blade perfect for localized cuts. This handle also gives it access to narrow regions. The surgeon can easily manipulate its long handle for accuracy.**[3]**

[3]

B.3. Organ knife: this is also called as solid forged bread knife also referred to simply as the long knife. And is specifically designed for morticians and pathologists.**[8]**.This is available in 152mm and 254mm blade length. This is used to smoothly cut solid organ into slice for examination, display, and photograph of organs cut surface.**[1]**

[13]

B.4. Brain knife: this is also called as Virchow brain knife. The brain knife has a double edge and is rounded at the front. It is available in 200mm blade size. These are used for dissection of brain during postmortem examination.**[3]**

[13]

B.5. Bistoury: [from Old French bistorie, dagger] - A slender knife, either straight or curved, used by introducing it beneath the part to be divided, and cutting towards the surface.[16]

[16]

C) Scissors: These are employed for blunt dissection, which involves inserting closed scissors between the planes to be divided and opening them before removing them, as well as for cutting tissues. Specialty scissors make dissection easier, especially when cutting tiny veins or opening specific organs.

Types of scissors:

C.1.Dissecting C.2.Intestinal enterotome(straight and curved)

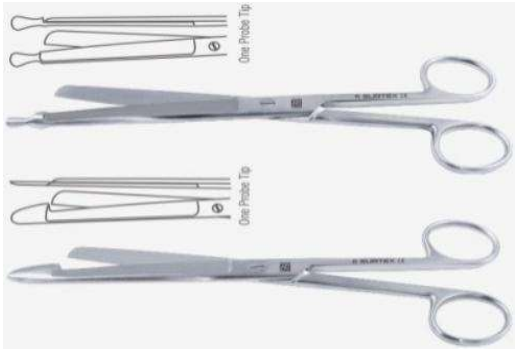
C.3.Mayo Dissecting Scissor

C.4.Lloyd-Davie (Goligher) Rectal Scissor

C.1. Dissecting: Is available in 5 inch (150mm) length in size, used for dissecting of coronary arteries.**[1].** Some of them have unique for cutting fine and delicate tissues. Sharp blade is used for cutting dense tissues.

[13]

C.2. Intestinal enterotome: Is of 2 types straight and curved. These are large scissors are used for opening the intestines. Scissor comes with special probe tips that are ideal for blunt dissection of delicate tissue. The bulb ended blade is inserted into the lumen of the gut, and the instrument is smoothly stripped down the length of the intestine. Cuts delicate bowel walls, membranes as well as surrounding fascia.**[3].**

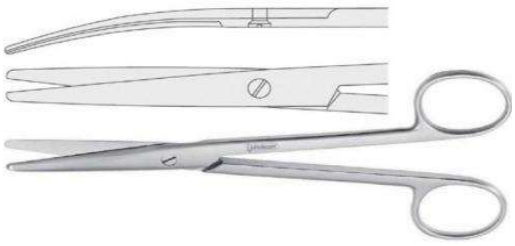


[3]

C.3.Mayo Dissecting Scissor: They are of 2 types curved and straight, and are available in a variety of sizes, ranging from 14.5 to 23.5cm. Its main purpose is to offer a dependable method for cutting, dissecting, and removing tissues from various body cavities and places. While the curved blade pattern allows for the cutting of deeper structures, the straight profile aids in the cutting of superficial tissues and sutures.

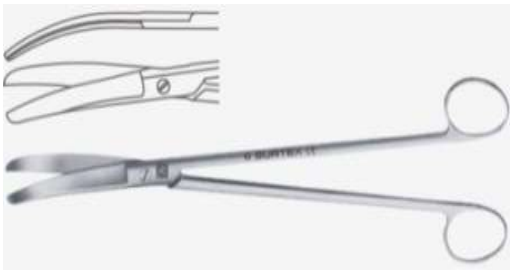
It is also used in cardiovascular, general surgery,

obs and gynecology, and orthopedic surgeries.**[3].**



[13]

C.4.**Lloyd-Davie (Goligher) Rectal Scissor:**It is available in 27 cm in length. Comes with round tips that are ideal for blunt dissection of tissues.Cuts skin, fascia, membranes, internal soft tissue as well as sutures. Has blunt tips which prevent piercing trauma. Also, the smooth outer edges of the instrument ensure a traumatic dissection. They also prevent pulling of adjacent tissue to prevent injury during postmortem.**[3].**



[3]

D)Rib shears:1.Rib shear 2.Gluck Rib Shear 3.Bone Rongeur 4.Bone nipper

D.1.Rib shear: With an overall length of 23 cm, this is perfect for slicing through the majority of fibrous formations. The razor-sharp blades on the Rib Shear easily cut through bones. cuts through tendons, sheaths, and other fibrous structures in addition to bones.In particular, use hefty blades to cut through difficult structures with great force. consists of one long blade and one sharp blade. The hefty construction of the blades reduces the effort required to dissect.The blunt tips shield delicate tissue from harm.[3].

[13]

D.2.Gluck Rib Shear:- Its razor-sharp blades easily cut through bones.cuts through tendons, sheaths, and other fibrous structures in addition to bones.In particular, it has hefty blades that can cut through dense structures with great force. Additionally, the blunt tips guard against harm to delicate tissue. Additionally, the forceps' smooth edges guard

against unintentional harm to sensitive tissue. For quick action during procedures, the operating forceps have a rivet screw joint. And is available with an overall length of 21cm . **[3].**

[13]

D.3.Bone Rongeur: this is used to cut off small bone fragments and other hard tissues.**[3].**

[13]

D.4.Bone nipper - used for removal of fine bone parts.[16]

[16]

E.Saws

E.1.Saterlee bone saw

E.2.Charriere bone saw

E.3.Langenbeck bone Saw

E.4.Rachiotomy saw or Luer's rachiotome .5.Spinal laminae saw[spinal knife] E.6. Hack saw

E.7.Stryker autopsy saw

E.8.Autopsy saw

E.9.Waterproof autopsy saw with vacuum

E.1.Saterlee bone saw: The blade is used to cut fibrous tissues and bones with a sharp edge. To further avoid damaging nearby structures, you can secure the blade in place using the screw on the frame. The long, serrated edge of the blade keeps it from sliding off smooth bones. and has a length of 29 cm to access small areas.**[3]**

[15]

E.2.Charriere bone saw: the handle with a bulky frame to enhance your grip and dexterity. The handle curve increases your comfort and prevents hand slips.The sharp blade in order to make efficient cuts of bones and fibrous tissues. In addition, the screw on the frame allows to fix the blade in place in order to prevent damage to

surrounding structures. The blade has a long serrated edge to prevent it from slipping from the tissues.**[3].**

[3]

E.3.Langenbeck bone Saw:- the handle to place and stabilize the blade on the diseased tissues. The handle's thick structure improves your dexterity and grip. The flat profile reduces hand slippage and improves comfortable to effectively cut through fibrous tissues and bones with the long blade. The serrated edge of the blade keeps it from slipping from the tissues. In addition, the outer edge is blunt to prevent damage to surrounding structures. Is 24.5 cm long and has a slender profile in order to see the blade's position directly. **[3].**

[13]

E.4.Rachiotomy saw or Luer's rachiotome [sometimes written as rhaciotome] - This is an old but sturdy instrument. Consists of two curved saw blades placed parallel to each other in such a way that the distance between them can be regulated by screws. There are two handles, a horizontal one for the right hand, and an upright one for the left hand attached to the fixed saw blade. It is used in opening the spinal canal.[16]

[16]

E.5.Spinal laminae saw[spinal knife] - Handy if rachiotomy saw is not available.[16].

[16]

E.6. Hack saw:-This is used to cut a long bone and to open the skull.**[1].**

E.7.Stryker autopsy saw: is also called as vibrating saw. The instrument of choice for most of the prosectors faced with removing the brain. The blade reciprocates rapidly with small amplitude. The action prevents the saw from cutting soft tissue notably the prosectors hand. The disadvantage of vibrating saw is that the throw up more potentially infectious aerosols than do hand saw. Used to cut the long bone and skull. They throw up more potentially infectious aerosol than hand saw.**[1].**

[15]

E.8.Autopsy saw/skull saw/oscillating autopsy saw:- Used to open the skull.**[1].**Can cut without damaging tissues, above all dispersing debris. Potential transfer of harmful pathogens.

[15]

E.9.Waterproof autopsy saw with vacuum: Used to open the skull. Aerosols spread is less. We need well trained staff to use this instrument.**[10].**

[15]

F.Chisel:F.1.Brunetti chisel :(straight and curved.) F.2.Virchow's (t shaped skull breaker) F.3.Councilman chiselF.4. Skull chisel/Chisel with fiber handle.

F.1.Brunetti chisel :(straight and curved.)

F1.1.Brunette chisel straight: It is of 28.5 cm long(280mm). utilized to release the spinal column. During an autopsy, a chisel may reveal the underlying tissues. Grasping the handle, the physician inserts the blade beneath the bony section. Then, they lift the blade to split the bones above it by using the handle as a lever. A chisel that has a spindle handle to improve dexterity and grip. Its bulky contour also helps to improve

comfort and reduce hand slippage. The tiny blade is used to apply pressure only to a specific region of the bone. This makes it easier to separate the bones.Furthermore, the wide neck allows to see the working tip easily to prevent accidental slips and slides. Right and left blades are available to suit different indications.[5]

[3]

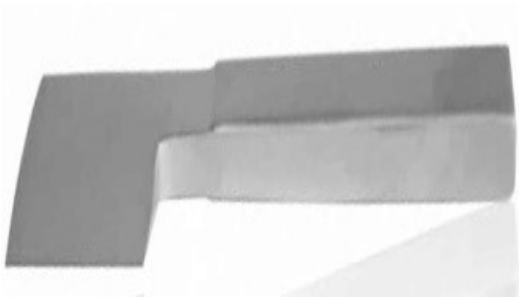
F.1.2.Brunetti Post Mortem Chisels (curved):the length of blade is220 mm During an autopsy, chisels may reveal the underlying tissues.The doctor grasps the handle and places the blade under the bony segment. Then, using the handle as a lever, they lift the blade to separate the bones above it. The **Brunetti Post Mortem Chisel** with a spindle handle to enhance your grip and dexterity. Moreover, it has a bulky profile to increase your comfort and prevent hand slips. The thin blade to focus the pressure on a small area of the bone. This ensures an easier bone separation. Furthermore, the wide neck allows to see the working tip easily to prevent accidental slips and slides. Right and left blades are available to suit different indications.[5].

[1].

F.2.Virchow's (t shaped skull breaker): Helps by removing pieces of skull bones. Autopsy surgeon separate the bones of the skull after cutting them with bone saws. The Autopsy surgeon grasps the handle and places the blade under the bony segment. Then, they lift the blade to separate the skull bone above it by using the handle as a lever. T-shaped design to improve dexterity and grip. Its flat, straight profile improves comfort and keeps your hands from slipping. To concentrate the pressure on a specific region of the skull, the blade narrows. This ensures an easier bone separation. The slender neck allows to see the working tip directly to prevent accidental slips and slides. Virchow Skull Breaker has a blade size of 15 mm. **[3].**

[13]

F.3. Councilman chisel: in the course of autopsy, it may reveal the underlying tissues.Grasping the handle, the physician inserts the blade beneath the bony section. Then, they lift the blade to split the bones above it by using the handle as a lever.A sturdy handle on the Councilman's Chisel will improve your dexterity and grip. Its hefty shape also adds to your comfort and keeps your hands from slipping.The tiny blade is used to apply pressure only to a specific region of the bone. This makes it easier to separate the bones. Furthermore, the slender neck allows to see the working tip directly to prevent accidental slips and slides. This is of 18 cm long. **[3].**



[15]

F.4. Skull chisel/Chisel with fiber handle: After scoring the calvarium with the vibrating saw or hand saw, the chisel is used to gently finish the separation of the loop of the calvarium from the lower skull, thus exposing the brain and. Its meninges (coverings)**.[1].**Easy to operate with help of hammer. And this can damage brain tissue during autopsy.

[3]

G.Hammers :-

G.1. Hammer with hook: Hammers are used by forensic doctors to exert a striking force on bone chisels.**[4]**This helps separate the calvarium (the vault-like

part of the skull that holds the brain) from the lower skull.[1]. And the hook is used to pull out the skull bone.

[3]

H.Mallets: H.1.Hajek Bone MalletH.2.Gerzog Bone Mallet

H.1.Hajek Bone Mallet: These come in handy during skull opening in combination with chisels. The head of the instrument has two flat hitting platforms. The head of the mallet has a flared design and its central part is slimmer than the sides. As a result, autopsy surgeons can press bone chisels or gouges against hard or cancellous bone and hammer with the mallet.The device features a hollow handle supplied with vertical grooves. This particular feature enhances gripping and minimizes finger strain during lengthy procedures.[3].

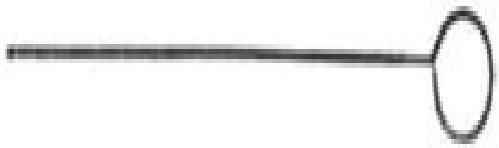
[13]

H.2.Gerzog Bone Mallet: Used in opening skull. The head of the mallet has a 25mm diameter. The head also has two flat surfaces that make contact. Thus, in order to make incisions or gather tissue for grafting, autopsy surgeons can hammer the impacting platforms of osteotomes and chisels. Furthermore, the device has a large, hollow handle with vertical grooves. This unique design provides surgical comfort and minimizes fatigue.**[3].**

[3]

I.Probes: 1) Probes 2) Directors

I.1.Probes: Large and small, for probing wounds etc for foreign bodies. May be single ended or double ended.[16].

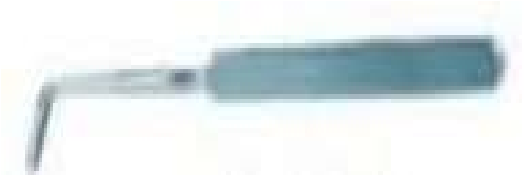


[16]

I.2.Directors (Curved and grooved) - A grooved metal probe used to direct another surgical instrument to a particular site which is out of view. Generally used by embalmers.[16].

[16]

J.Myelotome - This is used only for the purpose of cutting the spinal cord squarely across for the removal of the brain. Skull cap and dura removed, brain lifted lightly with fingers, myelotome inserted deep inside in the foramen magnum, and spinal cord sliced across. It has a slender steel stalk with wooden handle, and a short, thin, narrow blade set obliquely at the end of the stalk. This instrument is not absolutely necessary, as the cord may be satisfactorily cut with the point of the long section knife.[16].



[16]

Others:1)Autopsy table 2)measuring jug 3)magnifying glass 4)Plastic visor

1) Autopsy table: It has a Self cleaning /washing sprinkler on sides.A support column with 2 access doors.TheBasin Width/Depth/ Height is 400 x500 x200 mm.AKnee-operated mixing tap used for cold and warm water 3 m shower hose with hand sprinkler.There are two splash proof electrical outlets.Two buttons for height adjustment.ARegulator valve for integrated sprinkler system.Three piece work top with large waste basin/sieve insert circumferential perforation for safe removal of all odors.Can adjust the height of table according to our convenience.**[4]**.This is not available in all kinds of autopsy table this facility is available in new models .eg: YORCO.

[4]

2.Measuring jug: This is used to measure the blood or contents of stomach and other fluids from the body cavity during postmortem examination.[1]. Easy to handle, easy to read the measurements.

[3]

3.Magnifying glass: There are various types. Can be used for viewing finger prints, also in ballistics examination.[14].

[14]

[1]

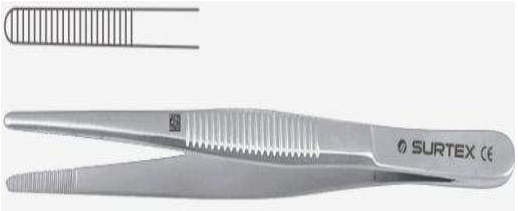
4.Plastic visor: for shielding eyes, face and mucosal surfaces from splashes etc while doing hazardous autopsies.[16].

[16]

2)Tissue manipulating instruments: A.Forceps

A.1.Non toothed /Blunt A.2.Toothed /Adsons A.3.Rubbertiped A.4.Spencer-Wells forceps

A.1.Non toothed /Blunt: They have serrated or grooved inner grasping edges which allow them to hold tissues without damaging them .They are used for holding delicate tissues such as vessels, nerves and bowel. This instrument should be handled with great care, as it generates greater pressure between its' jaws.**[7]**



[3]

A.2.Toothed /Adsons : These forceps are used to hold (grip) skin/dense tissue, such as skin closure.[7].They have inter

digitating teeth to hold tissue without slipping. They do cause a degree of tissue damage so should not be used on delicate tissue and care should be taken while performing autopsy.

[3]

A.3.Rubber tipped: Soft rubber tipped forceps allow for secure post-mortem dissection with minimal tissue damage or compression. A great choice for methods that don't involve contact with metal.Blue tips provide excellent contrast for specimenphotography.**[6].**

[6]

A.4.Spencer-Wells forceps - Can be used to grip slippery structures. Used during esophageal eversion.[16].

[16]

3.Suturing instruments:

A.Needles:- half curvedneedle called as hagedorn and double curved called sailmker'sneedle.This is large needle with an eye for sewing up the body when autopsy is finished. The stitching is similar to that use on the outer covering of baseballs. Heavy twine, which is much coarser than suture, is used for the procedure.**[1].**

[15]

[1]

B.Postmortem stapler: Used for sewing up dead body after postmortem or embalming. An alternative to traditional

thread and needle stitching. Stapler however is safer, as it reduces needle sticks. Faster, as it eliminates threading needles. Reduces stitching time. Disposable and one time use. Comes pre-loaded with 35, 1/4" length staples. A staple counter helps keep track of remaining staples. Staples are placed about 1/4" apart. Empty stapler disposed in infectious waste container.[16].

[16]

4.Odontology:

1.Vernierscalipers

2.Photography scale 3.Dental cast 4.Tooth extractor

A.1.Verniers calipers: Used to measure fine dimensions.eg. Inter canine distance[1]. Depth and width of injury can be easily measured.

[13]

A.2.Photography scale: This is used during photography of the

bite mark, so that it becomes easy to make the photograph of bite mark life sized. It is commonly used as a standard photographic scale in forensic photography.[1].Used to provide the viewer with an idea of the size of a mark or an impression.[2].

[1]

A.3.Dental cast: this is used when patient wants to raise an action for damages based on accusations of negligence or breach of contract.[2]. And to identify the bite marks.

[2]

A.4.Tooth extractor:helps to extract the teeth during dental examination.

[3]

5.Anthropometricinstruments:1.Measuring scale 2.Weighing machine 3.Weighing scale 4.Measuring tape. 5.Osteometric board/Anthropometric set/Hepburn type osteometry

A.1.Measuring scale: Available in 1feet/12 inch/30cm stainless steel. Used during examination to measure length and width of organs. Also used in age determination.**[1]**

[1]

A.2.Weighing machine: This is used to weigh the dead bodies usually before the postmortem is carried out.[1]. Can identify the built of the body. And easy to measure weight.

A.3.Weighing scale: This is used to weigh the organs. We can measure from 10grams to 5kgs. [1].It is durable, portable, cost efficient.

[1]

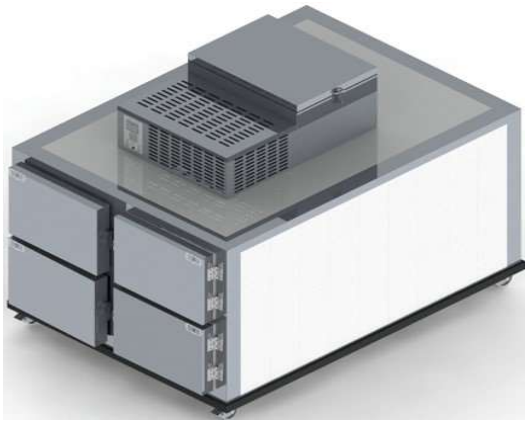
A.4.Measuring tape: The Folding metal scale is available in 7feet it is also available as 10feet. This is used during examination of dead bodies to measure the length of the dead bodies for identification purposes and age determination.[1].

[1]

A.5.Osteometric board/Anthropometric set/Hepburn type osteometry: This is used to find out the length of the bone or fetuses.[1].One fixed plane and one mobile plane to adjust according to length.

6.Others:

A.1.Mortuary chamber/cold storage: Mortuary storage system is designed for storing cadaverous under cool condition to prevent decomposition. These are latest development in Mortuary technology offering vast spacing advantage, over the conventional type together ,With greater hygiene. It is Double-walled . A gasket is provided on both the inside and the outside edges of the tongue sections. Front opening, hinged insulateddoors lined with magnetic gasket, handle and lock arrangement with keys in duplicate for individual dead bodies. Tray to carry dead bodies are in one piece, Stainless Steel, with a tubular edge and handle at both ends to carry dead body easily .Temperature -2°C to +5°C is maintained and 220V, single phase, 50 Hz. [4].



[4]

Conflict of interest: no conflict of interest.

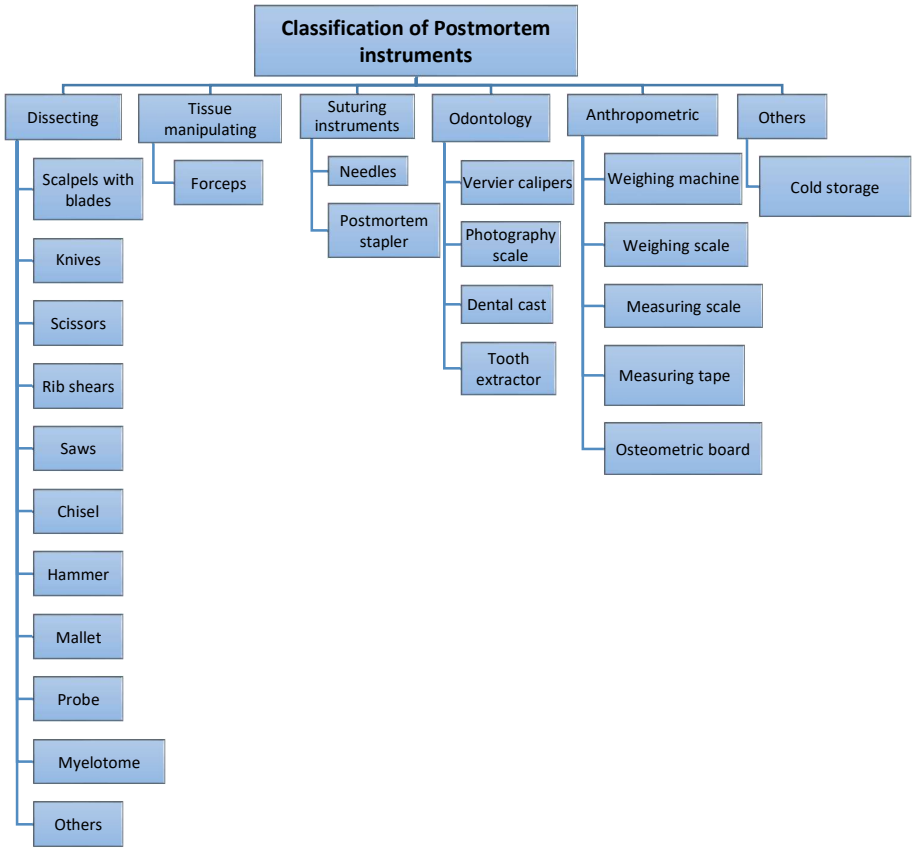
Acknowledgement: I acknowledge my professor, associate professor, colleague and forensic staff of nscgmc khandwa.

Source of funding: Nil.

Reference:

1. Gorea KK, Dogra TD, Aggarwal AD. Textbook of Practical Aspects of Forensic Medicine (A Manual For Undergraduates and General Practitioners). 1st edition. New Delhi: Jaypee Brothers Medical Publishers; India; 2010. Chapter 5, Equipments for Mortuary; p.197-209.
2. Jain N, Textbook of Forensic Odontology.1st edition. New Delhi: Jaypee Brothers Medical Publishers; India; 2013. Chapter 3, Dental Records and Forensic Photography; p.43-63.

3. Surtex instruments catalogue uk [Internet]. Cited on 1st December 2023. Available from https://surtex-instruments.com/
4. York scientific industries catalogue [Internet]. Cited on 5th December 2023. https://www.yorco.co.in/
5. Jalal surgical instruments catalogue Pakistan [Internet].Cited on 4th December 2023. https://jalalsurgical.com/
6. Fractional technologies instruments catalogue Singapore[internet] .cited on 6th December2023,https://www.fractiontechnologies.com/product-category/histology-microbiology/.
7. Michael R, Visenio, MS IV. Commonly Used Surgical Instruments [Internet]. University of Nebraska medical center. Cited on 4th December 2023. https://www.facs.org/media/wgcmalet/common_surgical_instruments_module.pdf
8. Barber Medical Supplies. Instruments. Cited on 6th December 2023 https://www.barbermedical.com/instruments.html
9. Gerned usa human surgical instruments catalogue usa [internet] cited on on 4th December 2023https://www.germedusa.com/
10. kugel medical catalogues Regensburg / Germany[internet] cited on6th december 2023https://www.kugel-medical.de/en/products/produktverwaltung/autopsy-saws/waterproof-autopsy-saw-with-vacuum-cleaner.htmlon
11. Gherman R, Ciocan, O Fabian. Surgical instruments. Cited on 8th december 2023. https://abilitatipracticecluj.ro/pdf
12. Bhadeshia H, Honeycombe R. Steels: microstructure and properties. Butterworth-Heinemann; 2017 Jan 24.
13. Falcon medical instrument catalogue[internet].cited on 9thjan 2024.https://falconmedical.pl/pl/8804-narzedzia_sekcyjne_autopsis.
14. Dreamstime us/Canada [internet] cited on 9th jan 2024.https://www.dreamstime.com/close-up-forensic-service-officer-holds-his-hand-magnifying-lens-cartridge-firearm-will-conduct-image106108706.
15. Mopec elevating pathology catalogue world headquarters united states[internet],cited on 8th jan 2024Dissection Instruments - Scalpels, Scissors, Forceps, Knives, Saws & More (mopec.com)
16. Aggarwal A. Textbook of forensic medicine and toxicology.1St Edition. New Delhi:Avichal publishing company; India; 2014. Chapter 5,Medicolegal autopsy;p 119-150.



International Journal of Medical Justice

Official Publication of GLAFIMS ASSOCIATION

An international peer and expert reviewed journal in the service Of Forensic Medicine, Forensic Toxicology, Forensic Science and Allied Forensic Sciences

Email: editor@ijmj.net **Web:** https://www.ijmj.net

Table of Content

Volume 2, Issue 1 January- June, Year 2024

International ISSN [CIEPS]: 3006-208X [Print] 3006-2098[Online] Online E-ISSN [INDIA]: 2583-7958

Date of Publication: Sunday June 30, 2024

Date of Online Availability: Sunday June 30, 2024

Content list Available at https://www.ijmj.net/archive/2024/1

Journal DOI [V2N1]: https://doi.org/10.5281/10.5281/zenodo.12601044

Journal Homepage: https://www.ijmj.net

Editorial Board: https://www.ijmj.net/editorialboard.htm

Indexing, Listing and Archiving: The Journal is indexed in International Scientific Index, Index Copernicus, ABCD Index. The Journal is listed in List of Journal of ICMJE, Archived in Zenodo open repository developed under the European OpenAIRE program and operated by CERN. IJMJ is archived on Journal Website. Available in GitHub.

Editorial Office:

G-1, City Center, Medical College Road, Aligarh 202001 UP, INDIA

Email: glafims@gmail.com **web:** www.glafims.org **Mobile No:** 0091-9897830036

International Journal of Medical Justice

Official Publication of GLAFIMS ASSOCIATION

An international peer and expert reviewed journal in the service Of Forensic Medicine, Forensic Toxicology, Forensic Science and Allied Forensic Sciences

Email: editor@ijmj.net **Web:** https://www.ijmj.net

Editor-in-Chief/Editor
International Journal of Medical Justice
Head office Address:
G-1, Ground Floor, City Center, Medical Road,
Aligarh 202002 India
E-Mail: editor@ijmj.net Website of Journal: www.ijmj.net

Editorial Office:
G-1, City Center, Medical College Road, Aligarh 202001 UP, INDIA
Email: glafims@gmail.com **web:** www.glafims.org **Mobile No:** 0091-9897830036

THE OFFICIAL PUBLICATION OF

IJMJ

GLAFIMS ASSOCIATION

International Journal of Medical Justice

VOLUME-II NUMBER-I

2024

Intl ISSN [CIEPS]: 3006-208X(Print)

Intl ISSN [CIEPS]: 3006-2098(Online)

National [E-ISSN: 2583-7958]

An international peer and expert reviewed journal dedicated in the service of Forensic Medicine, Forensic Toxicology, Forensic Science and Allied Forensic Sciences

Web: www.ijmj.net Email: editor@ijmj.net