Original Research Article

Evaluation of pattern of head injury and skull fractures in victims of road traffic accidents undergoing autopsy

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Abstract

Background: It is observed that seven percent of all the cases of breast cancer of whole world belong to our country. If our country is being considered then it has been found that more than twenty percent of all cancers affecting females is the breast cancer. The main concern regarding the management of breast carcinoma is the non homogenous characteristics of the breast tumour. Among the various classifications to reduce this non homogenecity in breast carcinoma the most accepted classifications has been based on the genetic characteristics of the tumours. In recent times there has been several studies has been conducted in other populations focussing on the immune histochemistry markers like Ki 67, cytokeratin 5/6, human epidermal growth factor receptor (HER) and progesterone receptor (PR) in breast carcinoma for assessing molecular and histological subtypes of breast cancer.**Aim:** To evaluate molecular subtypes and histological subtypes of breast cancer based on immune histochemistry markers for assessing the behaviour and disease aggressiveness **Methods and Materials:** Immunohistochemistry was performed using four main markers ER, PR, HER2, and Ki67 to classify them into four molecular subtypes Luminal A, Luminal B, TNBC and HER2. An additional marker CK5/6 was used to further classify TNBC into Basal like and Non Basal like. The characteristics of two subtypes Basal like and non basal like TNBC were analyzed separately. These molecular subtypes and tumour histological subtypes were correlated with clinocopathological parameters viz. Age, menopausal status, laterality (right or left), tumour size, tumour grade, LVI, necrosis, stromal reaction, lymph node status, pathological T stage(pT), pathological N (pN) stage, Nottingham's prognostic index (NPI).**Results:** In present study the age range of patients was between 28 to 80 years, with majority of patients in age group of 50 to 59 years. The mean age of presentation of histological subtypes was Infiltrating duct carcinoma, no special type (IDC-NST) – 53.56 years Infiltrating lobular carcinoma (ILC) – 54.08 years. Other histological subtypes – 57.07 years. In our study out of 278 patients, 105 were in premenopausal group and 172 were in postmenopausal group. Molecular subtypes was found to be more associated with aggressiveness of disease as compared to histological types. **Conclusion:**In comparison to histological subtypes, molecular subtypes can be a better tool for analysing the behaviour and disease aggressiveness of breast cancer, according to the findings of this study. We recommend that molecular classification be performed on all breast cancers and that it be used in conjunction with histological classification. It would be premature to dismiss histological classification at this time.

Keywords: Breast carcinoma, Molecular subtypes, histological subtypes

Introduction

Motorization has enhanced the lives of many individuals and societies, but the benefits have come with a price. As a developing country, India is no exception. Not a day passes without RTA happening in the roads in India in which countless number of people are killed or disabled. Head injury is the single most common cause of mortality in road traffic accidents; head being the most vulnerable part of the body. India accounts for about 10% of road accident fatalities worldwide[1].

Various patterns of head injuries like scalp abrasions,contusions , lacerations,incised wounds,meningeal haemorrhages and skull fractures can be found in road traffic accident cases. The injuries to bicyclist caused by an automobile injury may be similar to those sustained by a pedestrian except that the impact will be lower on the body or only against to some part of bicycle itself[2,3].Temporal and parietal bone fracture, fracture of base of skull and counter-coup injury to the brain are seen. Human, vehicular and environmental factors play roles before; during and after a trauma event therefore accidents have to be studied in terms of an epidemiological model (agent, host and environmental factors. The deaths in road traffic accidents are mostly preventable through intensive efforts of government institutions and civil society activists[4-6].Hence, this study was planned in the department of forensic medicine to analyse and evaluate in pattern of head injury and skull fractures in victims of road traffic accidents undergoing autopsy.

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Materials & methods

The present study was conducted in the department of Forensic medicine and Toxicology and it included assessment of consecutive 100 victims using non-probability purposive sampling that died in road traffic accidents and underwent post-mortem examination in department of Forensic Medicine and Toxicology. Ethical approval was obtained from institutional ethical committee in written after explaining in detail the entire research protocol. The material in the present study included the cases of road traffic accidents brought for medico-legal post-mortem examination. Decomposed bodies and bodies with no specific histories of head injury were excluded. In all these cases detailed personal information was recorded from relatives/accompanies of victim, inquest papers, and hospital records. The history regarding the circumstances of the accidents and other relevant data about injuries to the victims, the site of impact was obtained from inquest papers. Dead bodies were examined in detail during post-mortem for the presence of external injuries, internal injuries including bone and joints. A pretested Performa was used for

the purpose to collect data. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software version 17.0.

Results

Mean age of the subjects was 46.8 years. Majority of the subjects belonged to the age group of 41 to 50 years. Place of accident was urban in 65 percent of the cases. In 52 percent of the cases, only head injury occurred while in 21 percent of the cases, both head and chest region were involved. Depressed vertex fracture occurred in 31.91 percent of the cases while basal fracture occurred in 24.46 percent of the cases. Comminuted fracture occurred in 15.96 percent of the cases. Cause of death was head injury in 60 percent of the cases while it was injury to vital organs in 23 percent of the cases.

Table 1: Age and gender-wise distribution

Variable		Number	Percentage
Age group (years)	Less than 30	12	12
	30 to 40	29	29
	41 to 50	37	37
	More than 50	22	22
Gender	Males	61	61
	Females	39	39

Table 2: Place of accidents

Place	Number	Percentage
Rural	35	35
Urban	65	65
Total	100	100

Table 3: Area of the body injured

Area of the body injured	Number	Percentage
Head	52	52
Head+ Chest	21	21
Head+ limbs	16	16
Abdomen	6	6
Head+ Chest+ abdomen	5	5

Table 4: Pattern of skull fracture

Pattern of skull fracture	Number	Percentage
Linear fracture of vertex	13	13.82
Comminuted fracture	15	15.96
Depressed vertex fracture	30	31.91
Basal fracture	23	24.46
Crush fracture of skull	13	13.82
Total	94	100

Table 5: Cause of death

Cause of death	Number	Percentage
Head injury	60	60
Injury to vital organ	23	23
Shock & Hemorrhage	17	17

Discussion

Immediate death follows injuries to the heart, great vessels, spinal cord and the brain. In this class of death, resuscitation and early care have little role. Early death refers to death within a few hours of the injury and is attributable to conditions where immediate resuscitation and surgery would prevent the death. Late deaths appear days or weeks after injury. Majority of these are secondary to sepsis and organ failure. Good critical care of injuries would reduce these late deaths. Overall, 40% of trauma deaths are preventable[7-9].The mechanical forces like shearing, strains and biophysical motion that occur during accidents to the head are responsible for patterns of injuries. Road traffic accident is the third major preventable cause of death. Head injuries are the leading cause of death for drivers in frontal crashes and are also responsible for a large percentage of the deaths in side impact crashes[6,7].Hence, this study was planned in the department of forensic medicine to analyse and evaluate in pattern of head injury and skull fractures in victims of road traffic accidents undergoing autopsy. In the present study, mean age of the subjects was 46.8 years. Majority of the subjects belonged to the age group of 41 to 50 years. Place of accident was urban in 65 percent of the cases. In 52 percent of the cases, only head injury occurred while in 21 percent of the cases, both head and chest region were involved. Chourasia S et al included all the cases of death secondary to head injuries due to blunt force trauma brought to mortuary. Out of 50 cases 40 (80%) were males and 10 (20%) were females with a M:F ratio of 1:0.25. The most common age group involved was 21-40 years (32%) followed by 61-80 years (28%) and 41-60 years (18%). The most common cause of TBI was found to be road traffic accidents (68%) followed by fall from height (16%). Following TBI majority of the patients succumbed to death between 16-24 hours (34%) while spot death was seen in 12% of the cases. 39 (78%) patients were found to be having skull fracture majority of which involved vault alone (48.72%) while in 18 (46.15%) patients the fracture involved both vault and the base of skull. Contusion was present in 28(56%) patients. Most common type of intracranial hemorrhage was found to subarachnoid hemorrhage which was found in 41(82%) patients followed by subdural and intra-cerebral hemorrhages which were seen in 38 (76%) and 22 (44%) patients respectively[10].In the present study, depressed vertex fracture occurred in 31.91 percent of the cases while basal fracture occurred in 24.46 percent of the cases. Comminuted fracture occurred in 15.96 percent of the cases. Cause of death was head injury in 60 percent of

the cases while it was injury to vvital organs in 23 percent of the cases. Alexis R J et al found that off the 303 fatal head injury patients, a majority were males and age group between 21 and 40 years. Eighty-eight percent (267/303) of fatal head injuries were due to road traffic accidents. Twenty-five of the 303 patients reached our center within 1 h (golden hour) of trauma. Of the 303 fatal head injuries, 153 (50.5%) died within 24 h of reaching our center. The most common autopsy finding in this study was subarachnoid hemorrhage(SAH)(247/303, 81.3%). Diagnostic accuracy of Epidural hemorrhage (EDH) antemortem had the highest value (98.35%). SAH had least diagnostic accuracy value (45.72). Subdural hemorrhage (SDH) had highest sensitivity (57.02%). EDH had higher specificity (100%).Significant SDH, SAH, and brain contusions were not detected during antemortem evaluation. Their study revealed that among fatal head injury patients, half of them died within first 24 h after reaching to tertiary care center[11]. Castellani RJ et al suggested that Contemporary biomechanical theory of traumatic brain injury has its foundation in Holbourn's thesis on shear strain and Ommaya's primate experimentation demonstrating the role of rotation in a variety of lesions including subdural hematoma (SDH) and diffuse axonal injury. Empirical human observations have since confirmed,for the most part, the early concepts. Ethical concerns regarding primate research, however,have prompted in vitro models, which in turn has led to challenges with respect to the correlation between in vitro observations and the clinical data. Despite these challenges, medicolegal proceedings may call upon biomechanical engineers to reconstruct complex injury scenarios and offer opinions on the scientific plausibility of clinical disease states, such as SDH, hemorrhagic retinopathy, and cerebral edema, associated with hypothetical or proffered action sequences during the course of an unwitnessed homicide. It is important to note, however, that in vitro models by their nature are low-evidence quality studies that attempt to advance hypotheses but do not address cause and effect. As a whole, biomechanical models, as they pertain specifically to the brain and spine, are mathematically imprecise. Often, endpoints of limited relevance are relied upon (e.g., skull fracture thresholds), which predictably overestimate the in vivo risk of significant injury[12].

Conclusion

From the above results, the authors concluded that Head injury due to RTA is a recognized public health problem causing death and disability. It is required from concerned government authority to take appropriate and immediate measures for reducing the incidence of head injury.

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