

## Investigations on non-traumatic brain hemorrhage cases of 30 year below decedents from Tehran

Fares Najari\*<sup>1</sup>, Mohammad A. E. Hadi<sup>1</sup>, B. Nazparvar<sup>2</sup> and K. Saravane<sup>3</sup>

<sup>1</sup>Faculty member of Shahid Beheshti University of Medical Sciences, Tehran, Iran

<sup>2</sup>Faculty Member of Legal Medicine Organization, Tehran, Iran

<sup>3</sup>Forensics Assistant, Shahid Beheshti University of Medical Sciences, Tehran, Iran

### ABSTRACT

Cerebral hemorrhage due to tumours is as one of the most common reasons of mortality especially in the age group of 15-30 years, hence timely diagnosis of the place and the type of bleeding is quite important. Since the bleeding occurs in 5 to 10 percent of brain tumors, the bleeding inside the brain tumor is more common in brain metastases. As in Iran no any comprehensive study has done in this regards, this study has been conducted. In a descriptive cross-sectional and retrospective study, the medical documents of under 30 years decedents with non-traumatic brain hemorrhage referred to the anatomy hall of Tehran forensics Organization were investigated. A checklist containing credible cases was designed; and the data related to personal information, clinical features and the epidemiology indexes were extracted from the available documents and records of patients. It was observed that over 10 years ago, 100 people under 30 years with non-traumatic brain hemorrhage have been referred to the anatomy hall of Kahrizak; out of which, 77 percent had no any history of drug use, 16 percent with the history of smoking, 4 percent had the history of using crystal and the rest 3 percent had the history of using the drug. In investigating the type of non-traumatic brain hemorrhage, 12 people had cerebellar hemorrhage, 3 people epidural, 11 people subdural, 18 people cerebral ventricles, 29 people subarachnoid and 27 people had inside brain tissue hemorrhage that the most frequency of hemorrhage was related to subarachnoid. The obtained results of the present study demonstrate that non-traumatic brain hemorrhage in the persons with the history of drug abuse and women and men and the age groups has significant difference ( $P < 0.05$ ).

**KEY WORDS:** NON-TRAUMATIC BRAIN HEMORRHAGE, SUBARACHNOID HEMORRHAGE, SUBDURAL HEMORRHAGE

### ARTICLE INFORMATION:

\*Corresponding Author: [fares.hospital@yahoo.com](mailto:fares.hospital@yahoo.com)

Received 24<sup>th</sup> July, 2016

Accepted after revision 1<sup>st</sup> Sep, 2016

BBRC Print ISSN: 0974-6455

Online ISSN: 2321-4007



Thomson Reuters ISI ESC and Crossref Indexed Journal  
NAAS Journal Score 2015: 3.48 Cosmos IF : 4.006

© A Society of Science and Nature Publication, 2016. All rights reserved.

Online Contents Available at: <http://www.bbrc.in/>

## INTRODUCTION

Brain hemorrhage is one of the most common and important vascular events caused by mostly high blood pressure and the brain degenerative changes; and based on the obtained results of a study conducted by Raymond, (2000), it can lead to mortality and physical disability in the different grades. As annually in U.S.A in about three hundred and fifty thousand people physical disability occurs due to this disease, ( Broderick *et al.*, (2003).

According to the obtained results of a study conducted by Rincon *et al.*, (2011) the inside brain hemorrhage with the incidence rate of 11 to 33 cases per 100000 people annually is considered as a common disease. Results of Rincon and Mayer (2013) have shown that these hemorrhages are two times more common than bleeding in the subarachnoid space. These hemorrhages in men is a little more common than in women and among the blacks is more common than their whites peers.

The study conducted by Korkman *et al.*, (2010) showed that inside brain hemorrhage is as the deadliest form of stroke; and the mortality rate in them is 4%. Basically, surgeons believe that the young patients have better prognosis; accordingly, they are more interested that the surgery to be done on them. Based on the study conducted by Ghsemi, (2014) there is not any relation between age and prognosis.

The inside brain hemorrhage due to lack or presence of trauma is classified to two groups of traumatic or non-traumatic hemorrhage. Based on above data, non-traumatic inside brain hemorrhage or spontaneously is said to the brain inside parenchyma hemorrhage that may extend to inside the ventricles and rarely subarachnoid space Pursuance to the conducted study by Zuccarello, *et al.*, (1999), the reasons of inside brain hemorrhage are such as vascular problems, tumors, coagulation disorders, trauma vasculitis and drug causes. The most common drugs that lead to inside brain hemorrhage are sympathomimetics that are amphetamines, which can lead to hemorrhage in the brain sub cortical white tissue in form of intravenous, oral and intranasal within a few hours, followed by cocaine and crack which lead to internal brain hemorrhage, (Joynt, 1991, Bambakidis and Selman 2004, Koo-sarei *et al.*, 2009 and Lip *et al.*, 2011).

The major risk factors that are amendable are such as smoking, the disease of increasing the blood pressure, cocaine and alcohol consumption . The patients that their first-degree relative have the history of hemorrhage, are in the high risk . The high blood pressure almost doubles the risk of hemorrhage, Ingall *et al* (2000) and Victor and Ropper, (2001): apart from high blood pressure, there are three predisposing factors of brain hemorrhage such as smoking, (27%), increase of cholesterol with or

without increasing triglyceride (21%) and diabetic (10%). Brain hemorrhage based on the place of bleeding are classified to the inside brain, subarachnoid, subdural and epidural hemorrhage that all of them except subdural hemorrhage almost are occurred due to arterial bleeding. Based on studies by Massagli *et al.*, (1996), and Biller *et al.*, (2008) acute subdural hematomas occur due to fall or invasion and proportionally less because of road traffic accidents. In the present investigation, it has been observed that the most important clinical features is increasing of acute blood pressure inside the skull. As till now, no any study has been conducted in Iran regarding the cause of the reasons of non-traumatic brain hemorrhage, in the under 30 year age group, so we decided to conduct this study.

## MATERIAL AND METHODS

This descriptive study is cross-sectional as its studied population consists of the record of the referred decedents to anatomy hall over 10 years ago. Inclusion criteria 1- the referred decedents to Tehran Forensics Organization since early in 2004 till the end of 2014 , 2- if the reason of brain hemorrhage is non- traumatic 3- if the age of decedents is less than 30 year. Then, among the decedents, those who had traumatic brain hemorrhage and had the age more than 30 years were excluded. The minimum volume of sample was obtained 100 by using the Cochran's formula. And at the end, the record of 100 under 30 year patients with non- traumatic brain hemorrhage was investigated and analyzed. To analyze the data, the descriptive statistics such as gender, the age group and the history of drug consumption and the percent of all types of brain hemorrhage were used; and for inferential analysis, the Chi-square test with 5% significant level ( $P < 0.05$ ) was used.

## RESULTS AND DISCUSSION

The findings showed that among the under studied decedents with non- traumatic brain hemorrhage, 64% were man and the maximum percent (30%) allocated to the age group of 21 to 30 year and the minimum percent (15%) belonged to the age group of 11 to 20 year.

36 percent were women that the most percent (16%) allocated to the age group of 21 to30 and the minimum percent 9% allocated to the age group less than 10 year (table 1). According to the findings among men, the inside brain tissue hemorrhage with 22 % people had the most frequency and the cerebella hemorrhage and epidural with 3 people 3% had the minimum frequency.

Among the women with hemorrhage of subarachnoid with 14 people (14%) the most frequency and the epi-

Table 1: The frequency distribution of gender and the age group of under 30 year decedents with the non-traumatic brain hemorrhage referred to the anatomy hall of Tehran Forensic Organization during 2004-2014

Age	Age mean	Standard deviation	Average age	Total sum	21-30 year	11-20 year	Less than 10 year	Age Gender
27	22	9/98	19/25	64	30	15	19	Men
30	17	9/74	16/36	36	16	11	9	Women
	20	9/95	18/21	100	46	26	28	Total sum

Table 2: The frequency distribution of non-traumatic brain hemorrhages under 30 year decedents referred to the anatomy hall of Tehran Forensic Organization during 2004-2014 based on the gender

Sum total	Inside the brain tissue	Subarachnoid	Cerebral ventricles	Subdural	Epidural	Cerebellum	The kind of hemorrhage Gender
64	22	15	15	6	3	3	Men
36	5	14	3	5	0	9	Women
Pearson Chi-Square: 18.43 df: 5 Sig: 0.002							

dural hemorrhage was not seen (table2). Based on the findings the under 10 year people with 9 cases (9%), the most frequency was related to the hemorrhage of cerebral ventricles and with 2 cases (2%) the minimum frequency was related to the inside the brain tissue hemorrhage.

Among the people 11 to 20 year with 12 cases (12%) the most frequency was related to the inside brain tissue hemorrhage; and epidural hemorrhage and subarachnoid were not seen.

In the age group of 21 to 30 year with 24 cases (24%), the most frequency was related to the subarachnoid hemorrhage and the cerebella hemorrhage and epidural were not seen (table 3).

Pursue to the findings in the people with the history of smoking with 8 cases (8%), the most frequency was related to the brain inside tissue hemorrhage; and cerebella and epidural hemorrhage were not seen; and abusing the crystal had the most frequency relevant to

the subarachnoid hemorrhage and the drugs abusing had the most frequency related to the cerebral ventricles hemorrhage (table 4).

The findings showed that totally the docents with brain non- traumatic hemorrhage with 29 people (29%) had the most frequency related to the subarachnoid hemorrhage and with 3 people (3%) the least frequency was related to epidural hemorrhage.

Since subdural bleeding does not occur without trauma, 3 cases of baby boys following to hard delivery and 9 cases of subdural bleeding in the wake of the blood cancer were observed.

During this study, three premature birth of baby girl with subarachnoid hemorrhage and three cases of two-day baby girls with cerebral and subarachnoid hemorrhage along with under the scalp hematoma in tempo and left parietal as well as bilateral occipital were observed. In addition, three cases of 10day boy baby with extensive hemorrhage of cerebral ventricles and

Table 3: The frequency distribution of different non-traumatic brain hemorrhage in under 30year decedents referred to the anatomy hall of Tehran Forensic Organization during 2004-2014 based on the age

Sum Total	Inside brain tissue	Subarachnoid	Cerebral ventricles	Subdural	Epidural	Cerebellum	The type of hemorrhage Age
28	2	6	9	3	3	6	Less than 10 year
26	12	0	3	5	0	6	11-20 year
46	13	24	6	3	0	0	21-30 year

Pearson Chi-Square: 49.65 df: 10 Sig: 0.000

Table 4: The frequency distribution of non-traumatic brain hemorrhages types in under30 year decedents referred to the anatomy hall of Tehran Forensic Organization during 2004-2014 based on the history of abusing drug

Sum Total	Inside the brain tissue	Subarachnoid	Cerebral ventricles	Subdural	Epidural	Cerebellum	The type of hemorrhage
							History of drug abusing
77							Without history of consuming drugs
16	8	3	0	5	0	0	Cigarette
4	1	3	0	0	0	0	Crystal
3	0	0	3	0	0	0	Drug

Pearson Chi-Square: 35.54 df: 15 Sig: 0.002

under the scalp as well as mild bleeding in right parietal head was seen. Based on Biller *et al.*, (2008) findings, the acute subdural hematoma occurs due to fall or attack and invasion and in comparison less as a result of road traffic accidents. During this study, 3 cases boy baby following a hard delivery (CPD or Birth canal stenosis) and 9 cases subdural hemorrhage following the blood cancer were observed. In this study, the subdural hemorrhage of babies just were seen in the male gender; that were not seen in no other study, (Lotfi *et al.*, (2001). The conducted study by Massagli *et al.*, (1996) earlier had shown that epidural hematoma occurred due to bleeding in the space between dora and skull; and usually was present due to rupture of the membranes of brain vessels and almost was along with the skull fracture.

In the present study, three cases of epidural hemorrhage in new born boys, in the field of congenital disorders in the region of occipital were seen; that in these cases the bleeding was observed just in the male gender. In terms of prevalence, it is compatible with the obtained results of Giroud *et al.*, (1991); however based on the results of Sacco, (2000) no important statistical difference among the bleeding prevalence was seen among men and women (54 % men and 46% women). This difference may be due to the variety, country and circumstances of the subjects under study.

In the present study, by increasing the age, the risk of death increased and the age average of under studied population was 18.21 year. The age average of men was 19.25 and age average of women was 15.36 year. Based on the study conducted Nick-Seresht *et al.*, (2003) , the age of the patient had relation with the inside brain hemorrhage; and for each decade of increasing life, the risk of death increased 1.13 times as well.

Lip *et al.*, (2011) have also showed that by increasing the age, the risk of bleeding increases as well. According to the earlier findings of Ghandeharei *et al.*, (2009) and Khoda *et al.*, (2011) inside brain hemorrhage occurrence

increased as well. That is consistence with the results of this study. It can be said that by increasing the age, due to erosion of blood vessels and body members and occurrence of numerous diseases lead to increasing the risk of non- traumatic hemorrhage. In the present study, epidural hemorrhage with three cases showed the least cause of death. The hemorrhage of subdural was 11 cases in the Xuming *et al.*, (2007), the rate of subdural hemorrhage was reported to be 42%. The reason was the regional differences and life habits. Based on the investigations, none of the studies has been done regarding spontaneous occurrence of epidural and subdural hemorrhage. In this study, prevalence of cerebella hemorrhage was 12 cases (12%). Based on the work of Ingall *et al.*, (2000), the cerebella hemorrhage had 7% prevalence.

Based on the results, the brain ventricles inside hemorrhage were 18 cases and inside the brain tissue was 27 cases as well. Based on the studies conducted by Khoda *et al.*, (2011), the primary inside brain ventricles bleeding is as the most common place of brain bleeding. In the study conducted by Lotfi *et al.*, (2001) 35% of cases had inside ventricle bleeding. The results of Badiei (2006) on the newborns showed that 19.5% of them had inside brain ventricles hemorrhage. Similarly, Parnia *et al.*, (2006), have reported that the inside ventricle hemorrhage had the most frequency. Based on the obtained results of this study, the most percent of hemorrhage was related to subarachnoid bleeding with 29 cases prevalence.

In a review, it has been reported that the prevalence of subarachnoid hemorrhage in the difference population was from 2 percent of 1000 people annually for China and up to 22.5 % of 1000 people, annually for Finland ( Rincon and Mayer 2013). In an earlier conducted study by Lotfi *et al.*, (2001) about half of bleeding cases in the newborns hemorrhage (48%) were related to subarachnoid. Based on the results of this study on newborns, the highest amount of hemorrhage rate (6%) was

related to subarachnoid, the cerebella hemorrhage was (3%) subdural hemorrhage (3%) , epidural hemorrhage (3%), bleeding in the brain ventricles (3%) was seen; that the bleeding in the brain ventricles has been seen just in boy newborn; and the cerebella hemorrhage was seen in girl newborn.

The results of the present work, show that the frequency of non- traumatic brain hemorrhage among the persons with the history of consuming the drugs was different. The most factor of hemorrhage in these patients was smoking and the minimum role was related to drugs consumption ( $P < 0.05$ ). According to the results of Joynt, (1991), the most common and important disorders, among the neurological diseases was cerebrovascular occurrences, arising from numerous factors, which can lead to physical disabilities of different degrees followed by death. Pursuant to a conducted study by Koo-sarei *et al.*, (2009), consuming drugs such as amphetamines is also as one of the effective factors to cause these types of hemorrhages which can lead to damage in the white sub-cortical brain tissue within a few hours. In a study conducted by Broderick *et al.*,(2003), using such drugs increase the risk of brain hemorrhage. Data of the present study also demonstrate that consuming drugs such as cigarettes, crystal and amphetamines induce brain hemorrhages, which were effective respectively in the following order > subdural and subarachnoid hemorrhage > Subarachnoid hemorrhage > Bleeding of the brain ventricles.

## CONCLUSION

As the subdural bleedings are not created without trauma, 3 cases of boy newborn following the hard delivery (CPD birth canal stenosis) and 9 cases of subdural hemorrhage following the blood cancer were seen. Since, epidural hemorrhage without trauma is not possible. In the newborn's boy with vascular impairment in the field of congenital malformations, the epidural hemorrhages in the occipital areas without trauma were seen, as the subdural and epidural hemorrhages just occurred in traumatic cases (hit on head). In the present study, some cases of epidural or subdural bleeding in the newborns have also been seen, that show that the epidural and subdural hemorrhage always do not occur along with trauma. By considering that high prevalence of brain hemorrhage in the age group of under 30 years with the history of drugs consuming, it is required that the treating physicians should always consider the risk of these kinds of hemorrhages in the young people with drug abuse. It is proposed that in the future more studies should be conducted for investigating the other reasons, such as coagulation disorders, tumors, use of alcohol and others in the patients with hemorrhage.

## REFERENCES

- Badiei Z. (2006). Relative Frequency and the Risk Factors of the Brain Inside Ventricles in Premature Newborns Less Than 35 Weeks in the Intensive Care Units of Esfahan, Winter, 24(83):15-23.
- Broderick JP, Viscoli CM, Brott T.(2003) Major risk factors for aneurysmal subarachnoid hemorrhage in the young are modifiable. *Stroke* 34:1375-1381.
- Bambakidis NC, Selman WR (2004) Subarachnoid hemorrhage. In: Suarez JI, ed. *Critical care neurology and neurosurgery*. Totowa, N.J.: Humana Press:365-77.
- Broderick JM, Askins D, Hughes (2007) Guideline for the management of spontaneous intracerebral hemorrhage in adults: *American Heart Association Circulation*; 116 (16): e 391-413.
- Dai Xuming and Diamond JA.(2007) Intracerebral Hemorrhage: A Life-Threatening Complication of hypertension during pregnancy. *J clinical hypertension*; 9(11): 897-900
- Ghandehari K, S. Morteza, Sasan Nejad, Payam, Ahmadi, Fahimeh, Afzal-Nia, Azadeh, Khazaei, Mojtaba, Kalhor Mohsen (2009). The Effect of Surgery on the Patients with Subarachnoid Hemorrhage and /or Inside the Brain, *Journal of brain scientists and Iran Summer and Fall*, (26-27)8; 487-496.
- Ghasemi A.(2014) Determination of factors affecting outcome of surgery in patients with spontaneous intracerebral hemorrhages. *J Shahid Sadoughi Univ Med Sci*; 22(5): 1505-11.
- Giroud M, Gras P, Chadan N, Beuriat P, Milan C, Arveux P, et al.: 1991., Cerebral haemorrhage in a French prospective population study. *J Neurol Neuro surg Psychiatry*;54(7):595-8.
- Ingall T, Asplund K, Mahonen M, Bonita R(2000). A multinational comparison of subarachnoid hemorrhage epidemiology in the WHO MONICA stroke study; 31(5): 1054-61.
- Joynt RJ.(1991) Text book of clinical neurology. Harper & Raw Company:330
- Jose Biller, Betsy B. Love, and Michael J. Schneck (2008) In: *Bradley's Neurology in Clinical Practice*. 5th ed. Philadelphia: Butterworth-Heinemann/Elsevier
- Kirkman MA, Mahattanakul W, Gregson BA, Mendelow AD (2008) The effect of the result of the STICH trial on the management of spontaneous supratentorial intracerebral haemorrhage in Newcastle. *Br J Neurosurg*; 22(6): 739-46.
- Koosarei, Mohammad Reza, Ahangar, Morad Ali (2009). Reporting of a Brain Hemorrhage Caused by Consuming the Crack, *The journal of Army of Islamic republic of Iran University Medical of Science*, Winter, 7 (4) (serial 28): 320-322.
- Khoda-Babdehloo, Ramin, Eatemadi Far, Masoud, Nasre Esfahani, Amir Hossein(2011) Investigation of Common Places of Primary Bleeding Inside the Brain Paranchyma based on Brain CT-SCAN Among 226 patients in Esfahan, *Researches in the field of medicinal science*, November and December, 10 (6): 410-410.
- Kyu-Hong K(2009). Predictors for functional recovery and mortality of surgically treated traumatic acute subdural hematomas in 256 patients. *J Korean Neurosurg Soc*;45(3): 143-150.

- Lip GY, Frison L, Halperin JL, Lane DA(2011)Comparative validation of a novel risk score for predicting bleeding risk in anti coagulated patients with atrial fibrillation: the HAS-BLED(Hypertension, Abnormal Renal/Liver Function, Stroke, Bleeding History or Predisposition, Labile INR, Elderly, Drugs/Alcohol Concomitantly) score. *J Am Coll Cardiol* ;57(2):173-80.
- Lotfi, Nosrat, Mohammad- Zdeh, Ashraf, (2001). Investigating the Inside Brain Hemorrhages in the Hospitalized Newborns in NICU. *Emam Reza Hospital in 2008, Medical College of Mashhad Medical Science University journal, Bahar, 44 (71) 71-77.*
- Massagli TL, Michaud LJ, Rivara FP (1996) Association between injury indices and outcome after severe traumatic brain injury in children. *Arch Phys Med Rehabil*; 77(2): 125-32.
- Nick-Seresht, Ali Reza, Jan- Azin, Hossein(2003) Brain Primary Hemorrhage Due to High Blood Pressure in the Referred Patients to the Hospitals Affiliated to Shiraz Medical Science University, *Medical researches journal, Winter, 2 (2) (serial 6): 40-47.*
- Parnia, Rahman, Savadi Oskuei, Dariush, Mousavi, Seyed Abbas (2006). The Mortality Rate of Hospitalized Patients with Brain Inside Hemorrhage and the Effective Factors on that in the Ardabil Alavei Hospital, *Research- Scientific journal of Ardabil Medical Sciences University, 6 (4) ( serial 22): 363-367.*
- Raymond D.(2000) *Adams principle of Neurology.Cerebrovascular disease McGrawhill 777-827*
- Rincon F and Mayer SA. (2013) The epidemiology of intracerebral hemorrhage in the United States from 1979 to 2008. *Neurocrit Care* 19(1): 95-102.
- Simon RP, Aminoff MI, Greenberg DA(1999) *Clinical Neurology, Uthed, Appleton and lange, Stanford. Pp 300-304.*
- Sacco RL (2000) Pathogenesis, classification and epidemiology of cerebrovascular disease. In: Rowland LP, ed. *Merrit's neurology. 10th ed. Philadelphia, USA: Lippincott Williams and Wilkins: 217-29.*
- Victor M, Ropper AH(2001): *Cerebrovascular disease. In: Victor M, Ropper AH, eds. Adams and Victor's principles of neurology. 7th ed. New York, USA: McGraw-Hill Co;821-924.*
- Zuccarello M., M Kreysts, G. Humadoci (1999): Early surgical treatment for supratentorial intracranial hemorrhage. A randomized feasibility study. *Stroke* 1830: 1833