VOLUME-8, ISSUE-11, NOVEMBER-2019 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Plastic Surgery

PROFILE OF PLASTIC SURGERY TRAUMA PATIENTS AT H. ADAM MALIK GENERAL HOSPITAL MEDAN

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ABSTRACT

Introduction: According to data from *Perhimpunan Dokter Bedah Plastik Rekonstruksi dan Estetik Indonesia* (PERAPI), there are only 193 plastic surgeons throughout Indonesia. There is no sufficient data that described pattern of incidence, workload, and role of Plastic Surgery in trauma cases at Indonesian Referral Center Hospital, especially in the Province of North Sumatra.

Methods: This research is a descriptive study with a retrospective approach. Sample of this study was medical records of trauma patients who required Plastic Surgery who came to the H. Adam Malik General Hospital Medan Emergency Room (1 January 2016-31 December 2018). This study used total sampling method.

Results: This study involved 536 patients and 40.85% included in the adult age range. Men vs women ratio is 3:1 (405 vs 131). Based on type of injury, the most common injury is facial trauma, followed by burns and soft tissue injuries (291, 178 and 66). The most common etiology is traffic accidents (90 cases). Most of facial bone fractures located at mandibular bone (segmental fracture). Inhalation trauma due to burns only occurred in 6 cases (3.24%). Most of soft tissue injuries occurred at lower extremities (upper limbs).

Conclusion: Traffic accidents are the most common etiology for trauma in Plastic Surgery. Most of the patients are men and included in the adult age range. Facial trauma is the most common injury in Plastic Surgery. Most facial bone fractures located at mandible (symphysis and parasymphysis). Most of burns injury are fire burns. Most soft tissue injuries are located at lower extremities (upper limbs).

KEYWORDS : Plastic Surgery Trauma - Facial Trauma – Burns Injury - Soft Tissue Injury

INTRODUCTION

Indonesia is the fourth most populous country in the world. Indonesia has a population estimated at more than 264 million (3.51% of the total world population). North Sumatra population is 14,102,911 and ranked as 4th most populous county in Indonesia (BPS, 2017). Based on 2016 World Bank data, Indonesia is one of the lower-middle income countries (WHO, 2014). There is a close relationship between high mortality and morbidity rates with population and economic level, and trauma is one of the 10 main causes of death in lower-middle income countries. Trauma is still the first leading cause of death in young and productive age groups in the world. In Indonesia, trauma is the 4th leading cause of death, but in the age group of 15-25 years it is first cause of death. Riyadina et al reported death due to injury is projected to increase from 5.1 million to 8.4 million (9.2% of overall deaths) and is estimated to be the third cause of disability adjusted life years (dalys) in 2020. Injury problems contribute 15% of death, 25% disease burden and5% economic loss of growth development product (GDP). In Indonesia, economic losses due to injuries especially for traffic are estimated about 2.9% of gross domestic income (GDP).

Trauma management involves multidisciplinary procedure, especially in the surgical section. Multiple trauma almost involves more than one surgical division and not infrequently Plastic Surgery is included. That is because Plastic Surgery is not organ oriented but can cover all organs from head to toe. Hendricson et al reported that 29% of all trauma cases underwent plastic surgery procedures. In trauma cases, Plastic Surgery has a workload equivalent to other sub specialty such as Neurosurgery and orthopedics (Hendrickson, 2017). In the UK Plastic Surgery handles more than 100,000 cases of trauma annually with an average of 308 cases per day.

In Indonesia, not all provincial hospitals that are regional referral centers have plastic surgeons. According to data from *Perhimpunan Dokter Bedah Plastik Rekonstruksi dan Estetik Indonesia* (PERAPI), there are only 193 plastic surgeons throughout Indonesia, compare with Singapore which has 60 plastic surgeons and Malaysia which has 31 doctors. With a ratio of 1 plastic surgeon per 1 million population between the needs of plastic surgeons and the total population of Indonesia, this ratio is still far from the ideal category.

Injury due to trauma has a significant impact on patients in terms of social, functional and financially. Injuries that included in plastic surgery emergencies field are usually not life-threatening, except injuries that cause haemodynamic disorders and instability, for example in the case of amputation or injury to arteries,. However, injuries related to plastic surgery can result in significant disabilities and reduced patients quality of life (Hacikerim, 2011).

Surgical operations are broadly divided into elective and emergency operations. The role of plastic surgery is widely known, especially in terms of aesthetics and reconstruction that carried out electively. The role of plastic surgery in trauma emergency surgery operations is not well understood. In the literature, little research has focused on the role of Plastic Surgery in trauma centers (Peterson, 2003). There is no

Submitted : 05th June, 2018	Revised : 26th July, 2019	Accepted : 27th August,2019	Publication : 15th November, 2019

sufficient data that described pattern of incidence, workload, and role of Plastic Surgery in trauma cases at Indonesian Referral Center Hospital, especially in the Province of North Sumatra.

METHOD

This research is a descriptive study with a retrospective approach. Sample of this study was medical records of trauma patients who required Plastic Surgery who came to the H. Adam Malik General Hospital Medan Emergency Department from1 January 2016 to 31 December 2018. This study used total sampling method.

The inclusion criteria of this study were all medical records of trauma patients who were treated for Plastic Surgery recorded starting January 1, 2016 to December 31, 2018. Exclusion criteria in this study were non-traumatic Plastic Surgery patients or trauma patients who came to the emergency room that did not involve with Plastic Surgery.

Data were evaluated based on the distribution of management procedures, age and sex, causes and types of injury. Patients' age distribution classified by sex was evaluated. Patients were evaluated according to three main categories: facial trauma, burns injury, and soft tissue injuries. The data obtained is collected, processed, and presented descriptively in tables and diagrams. Explanation of tables and diagrams will be presented in narrative form

RESULTS

This study involved all plastic surgery trauma patients who were treated at H. Adam Malik Hospital, Medan from 1 January 2016 to 31 December 2018 with a total of 536 patients. 113 patients in 2018, 199 patients in 2017 and 244 patients in 2016.

Table 1. Number of Plastic Surgery Trauma Patients in the last 3 years (n = 536)

Year	2016	2017	2018
	224	199	113

Table 2. Sample Distribution (n=536)

Age (years)	Frequency (n)	Percentgse(%)
0 – 5	64	11.94
5 – 18	125	23.32
18 – 60	219	40.85
> 60	128	23.88
Gender		
Male	405	75.55
Female	131	24.44
Type of injury		
Facial trauma	291	54.29
Burn trauma	185	31.61
Soft tissue injury	60	12.31

In the table above, age is divided into 4 groups, toddler (0-5 years), children (5-18 years), adults (18-60 years) and geriatric (> 60 years), whereas 291 cases (40.85%) are included in adult age range. Based on gender, ratio of male and female is 3: 1 (405 and 131). Based on type of injury, the most common injury is facial trauma, followed by burns and soft tissue injuries (291, 178 and 66).

Table 3 Distribution of facial trauma samples based on facial tissue (n = 291)

Age (year)	Facial Soft Tissue	Facial bone	Mixed	Total
0 – 5	3	1	4	8
5 – 18	10	32	11	53
18 – 60	37	98	53	188
> 60	9	21	12	42
Gender				
Male	42	107	72	221
Female	13	39	18	70
Etiology				
Traffic accidents	23	101	56	180
Work accidents	10	17	13	40
Physical violence	5	21	8	34
Fall	4	8	5	17
Others	4	20	6	20

From total 291 facial trauma patients, trauma is mostly distributed as facial bone trauma (152), followed by mixed of soft tissue and facial bones trauma (80) and soft facial tissues trauma (59). Male patients are more than female (3: 1). Traffic accidents is the most etiology (90), followed by work accidents (7), physical violence (6), fall (6) and others (3). Based on age, patients are most in adult age (18-60 years-52 cases) then age 5-18 years (36 cases).

Table 4. Distribution of etiology based on the type of sex (n = 291)

Etiology	Male	Female	Total	Percentage
Traffic accident	126	54	180	61,85
Work accident	30	10	40	13,74
Physical violence	5	1	6	2,06
Fall	4	2	6	2,06
Other	2	1	3	1,03

The most etiologies based on male gender are traffic accidents, work accidents, physical violence, and falls. Men patients is more than women in all etiologies.

Table 5. Distribution of facial bone fractures based on bone type (n = 291)

Fracture	Frequency(n)	Percentage (%)
Mandible	104	44,06
Maxila	48	20,33
Nasal	12	5,08
Frontal	5	2,11
Zygoma	15	6,35
Mixed/Multiple	52	22,03

The number of bone fractures is 236 cases, and the most distribution is facial bone fractures in the mandibular bone, then the maxilla, multiple / multiple fractures, nasal, zygoma and frontal.

Table 6. Distribution of mandibular fractures by location (n = 104)

Mandibular fracture	Frequency (n)	Percentage (%)
Symphisis/ Parasymphisis	40	38,46
Angulus	12	11,53
Condilar	8	7,69
Corpus	16	15,38
Ramus	12	11,53
Segmental/multiple	16	15,38

The most common location of mandibular fractures is segmental fractures (20 cases), followed by the corpus (16 cases), symphysis / parasymphysis (12 cases), angulus (6 cases), condilar (2 cases) and ramus (1 case).

Table 7. Distribution of facial trauma based on time of implementation (n = 291)

Time management	Facial soft tissue	Facial bone
Initial period	50	139
Advanced period	5	7

The initial period is carried out when the patient is in the emergency room, the patient with soft tissue trauma is almost entirely performed in the initial period, whereas facial bone fracture patients almost always had a surgery in the advanced period.

Burn trauma patients' characteristics

Table 9. Distribution Burns based on age, type Gender and Trauma Inhalation (n = 185)

Age (year)	Frequency(n)	Percentage (%)
0 – 5	25	13,5
5 – 18	28	15,1
18 – 60	124	67
> 60	8	4,3
Gender		
Male	144	77.8
Female	41	22.2
Inhalation trauma		
Yes	6	3.24
No	179	96,75

Out of a total of 185 burn patients treated, males are more than females (144 vs 41 (3: 1)). Most patients included in adult group (18 – 60 years, 124 cases) followed by the age group 5-18 years. Inhalation trauma was found in only 6 cases (3.24%).

Table 10. Distribution Burns based on the type of sex (n = 185)

Etiology	Male	Female	Percentage (%)
Fire burn	63	36	52,43
Electrical burn	29	4	17,83
Scald burn	37	16	28,64
Chemical burn	2		0,01

Characteristics of soft tissue injury patients

Table 11. Distribution of Soft Tissue Injuries based on etiology (n = 60)

	Frequency (n)	Percentage (%)
Etiology		
Traffic accident	32	53,33
Work accident	9	15
Physical injury	6	10
Fall	5	8,3
Other	8	13,33

Most of soft tissue trauma etiology is traffic accident (32 cases), then work accidents and physical violence (9 and 6 cases respectively).

Table 12. Distribution of Soft Tissue Injuries by location (n = 60)

	Frequency (n)	Percentage (%)
Upper Extremity	**22**	
Upper arm	5	8.33
Arm under	8	13.33
Hand	9	15
Lower Extremity	**30**	
Upper limb	14	23.33
Lower limb	11	18.33
Foot	5	8.33
Thorax	6	10
Abdomen	4	6.66
Others	3	5

Most soft tissue injuries is located in the upper limbs, followed by the lower limbs, hands, forearms, thorax, upper arms and legs, abdomen, and others.

Table 13. Distribution of Soft Tissue Injuries by type of injury (n = 60)

	Frequency (n)	Percentage (%)
Skin- limited wounds	4	6,66
Wounds with other structure involvement	56	93,33

Tabel 14. Distribution Injury Network Software based selection of action of treatment (n = 60)

	Frequency (n)	Percentage (%)
Action room	23	38,33
Operating room	37	61,66

DISCUSSION

Surgical operations are broadly divided into elective and emergency operations. The role of plastic surgery is widely known, especially in terms of aesthetics and reconstruction that carried out electively. The role of Plastic Surgery in trauma patients is not well known. In this study, the number of trauma patients treated was almost comparable to elective surgery patients. In 2016 the total number of Plastic Surgery inpatients was 500 with the number of trauma patients being treated at 244 patients (44.8%). In 2017, 199 (64.1%) of a total of 381 patients and in 2018, 113 (39.7) of a total of 284.

From these data, we can conclude there is a decrease tendency of Plastic Surgery trauma patients during last 3 years as there is a sufficient surgeons in the North Sumatra region so it can reduce the referral number of trauma patients from the region (bppsdmk.depkes.goid, 2019).

In this study the ratio male and female patients is 3: 1, and it's similar with previous studies (Serma, Ozay, 2011). In some other studies the ratio between men and women reach to 4.8: 1. The high rate of facial trauma in men is associated with local culture, where in general men spend more time outside the home, use motor vehicles as their transportation, have sports hobby that involved physical contact, and also consume alcohol. (Almasri, 2013). The ratio between men and women can be lower in western countries where the issue of gender equality makes women as active as men. (Mansoor, 2012).

The main cause of trauma in Plastic Surgery is still dominated by traffic accidents, and most of patients are adult (18-60 years, 40.85%). (Grace, 2015). Facial trauma is the most etiological causes (54.29%). In other studies, the most etiological was upper limb injuries including hands (64%) then soft tissue injuries with defects in the lower extremities and chest (37%) while facial and neck trauma were in third position (25%). (Serma et al, 2011). This is possible because at the center where this study was conducted, injuries of hands and upper extremities are the working area of Plastic Surgery Department. Policy in H. Adam Malik General Hospital Medan suggest that patients with upper limb and hand trauma, especially trauma that involved other structures such as tendons, nerves or traumatic amputation / crush injury is still the orthopedics' scope.

Facial trauma

The face is a complex arrangement of anatomic and aesthetic functions that have a role in the personality and social culture of an individual. Facial trauma can frustrate and make patient loss their self-confidence. Therefore, a comprehensive and best handler is needed.

In this study facial trauma is the most type of trauma in Plastic Surgery (291 cases, 54.9%) while the most common etiology in this study is traffic accidents, similar with the literature and several other studies (Alahmed, 2004). This happens because of the large number of private vehicles, especially motorbikes compared to mass transportation, that can minimize the risk of

accidents. The level of use of Personal Protective Equipment (PPE) such as seat belts or helmets is still low and good traffic awareness is still low.

Age and sex factors in this study are similar with previous studies, where men vs women ratio varies from 2: 1 to 4:1, and this study found that ratio of men compared to women is 3: 1 (Gasner, 2003). The age group of 18-60 years is as many as 168 cases. The age range of 18 - 60 years is the productive age with mobilization thereby increasing the risk of trauma.

There are several etiologies of facial trauma which are classified into other groups, including pediatric patients with dog bites on the face which also result mandibular fractures, facial trauma due to sports activities, and attempted of suicide.

The most common facial bone fracture is the mandible fracture (44.6%), while in other literature and previous studies its prevalence was various, between 24% to 75% (Kelley, 2005). This is followed by multiple fractures, and maxilla fractures. The most common multiple fractures in this study were mandibular fractures accompanied by maxillary fractures. The location of mandibular fracture was most common in symphysis /parasymphysis, segmental fracture and mandibular corpus respectively 38.46%, 11.53% and 11.53%. Semra, et al, showed most fractures located in the mandible (44.3%), followed by condyle fractures 25.3%. A study at Arifin Achmad Hospital in Pekanbaru by Susilawati et al., showed that from total of 414 maxillofacial trauma cases in the period of 2010 – 2013, mandibular fractures are the most common fracture(18.36%), followed by maxillary (10.63%) and zygoma fracture (6.28%).

Almost all of patients with facial soft tissue trauma underwent surgery in the initial period (90.9%). This was done because some patients could be treated with local anesthesia in the emergency room. Whereas patients with facial bone fractures were mostly performed in the advanced period (95.20%) because material for ORIF piercing are not always available. Another reason is due to patients economy, where the BPJS does not cover the patient's trauma.

Burns

Globally, burns are responsible for around 11 million injuries annually and ranks as the fourth health burden related to injuries after traffic accidents, falls, and violence. (Peck. M.D., 2011). The incidence of significant burns in low and middle income countries (LMIC) is almost ten times greater than in high income countries (HIC) (1.3 per 100,000 people compared to 0.14 per 100,000 people); furthermore, LMIC holds 90% of all burns globally. (Haagsma, 2016).

In this study, total of 185 burns patients were hospitalized, there were more males than females (144 vs 41 (3: 1)). This result similar with previous studies. Research by Farish et al in Iraq, from a total of 676 burns cases showed that men and women ratio is 67.1% vs 32.9 (2: 1). (Farish, 2019)

The largest age group in adulthood is 18 - 60 years, this is also similar with other studies (Frans et al, 2018). In a Dutch study, the incidence was high in children aged 0 - 4 years (14.3 / 100000) and elderly people> 70 years old. (Vloemans, 2008). Burns inhalation trauma only occurred in 6 cases (3.24%).

Most of burns trauma were classified as fire burns, scald burn, electrical and chemical burn (52.3%, 17.83%, 28.64%, and 0.01%). In other studies, scald burn was the most type of burns trauma (125; 37.2% of 336), then fire burns (75; 22.3% of 336), and electrical burn (36; 10.7% of 336). (Frans et al, 2018). In this study, children aged 0-5 years old are usually having fire burns, contrast to other studies where the most common of burns injury is scald burn.

Soft Tissue Trauma

Soft tissue trauma is divided into several parts, such as upper limb trauma, lower limb, trunk and abdomen. Of the 4 main sections, the lower extremity is the most common part that included in soft tissue trauma (30), followed by upper limb (22), thorax (6), abdomen (4). This result is contrast to the results of previous studies that described most of soft tissue injuries is originating from the upper arm. (Semra et al 2011) As previously explained, this can be occur because of the central policy in the division of authority for handling patients. The ratio between men and women is 4: 1.

Based on the etiology, the most common soft trauma is caused by traffic accidents (53.33%). This is similar with research by Mansoor et al in 2012 in India. Based on their age, soft tissue trauma is common in adult age group (18-60 years). These results are similar with previous studies.

Soft tissue trauma without other structures involvement, such as blood vessels, nerves, tendons, bones or tendons and extensive tissue loss can be performed in the emergency room with local anesthesia. The advanced period is usually performed in patients with severe or multiple injuries or patients who require materials that are not available in the emergency room, such as plates and screws that required for facial bone fractures.

CONCLUSION

Traffic accidents are a major cause of trauma in Plastic Surgery. Trauma is usually occurred in male and adult patients. Facial trauma is the most frequent case of trauma in Plastic Surgery. Most facial bone fractures are located at mandible, usually at symphysis and parasymphysis. Most burns injury are fire burns. Most soft tissue injuries are located in the lower extremities (upper limbs). Further research needs to be done with the addition of more variables such as occupation, origin of referral, length of stay, and coordination between orthopedics and Plastic Surgery regarding the division of authority in trauma to the upper extremities (arms and hands).

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