

Clinical Profile of Patients with Manus Fracture Caused by Firecracker Blast

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ABSTRACT

Background: Fireworks are traditionally used by various cultures or groups for celebrations. Estimated 10,000 to 12,600 people are injured because of fireworks in America every year. The type of fireworks that cause the highest injury is firecrackers with the incidence rate of 30% to 67% of all cases of injury due to fireworks. Indonesia is a country with the largest Muslim population in the world and firecrackers are often used to welcome Ramadan and Eid al-Fitr. This study aimed to report the Clinical profile of patients with manus fracture caused by firecracker blast.

Case Presentation: The case study was taken from patients of Karima Utama Surgical Hospital, Surakarta, Indonesia, during Ramadan and Eid al-Fitr (from May 14 to June 15) 2018. A total of 36 patients were fractured due to firework explosions recorded in medical records during that period. Data such as gender, age and fracture diagnosis were collected in this study.

Results: Males have a higher prevalence of 28 (78%) than female 8 (22%), with the highest

group age between 11 to 20 years with 11 cases (31%) and more than 60 years being the lowest age group with 2 (6 %) cases of a total of 36 respondents. The right hand as the dominant hand has an injury incidence rate of 31 (86%) compared to the left hand 5 (14%) and more often occurs single fracture 22 (61%) compared to multiple fractures 14 (39%) including the amputated phalanx.

Conclusion: Our study showed 36 patients had fractures of the manus due to firecrackers, with the majority of male victims 28 (78%) and single manus fractures 22 (61%) with the right-hand dominance at the age between 11 to 20 years.

Keywords: manus fracture, firecracker

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BACKGROUND

Firecrackers are traditionally used by various cultures or groups for celebrations. Many publications that report firecrackers abuse are a major cause of injuries from various types of celebrations throughout the world. Firecrackers are used in various kinds of celebrations in the world such as Independence Day and Halloween in America, Ashura in Morocco, Hari Raya in Malaysia and Eid al-Fitr in Indonesia (Adhikari et al, 2013; Cletus

et al., 2016; Gelbart et al., 2007; Gordon et al., 2015; Hatamabadi et al., 2013).

Most victims of firecrackers blast have injuries to the face, arms and hands. The incidence rate in America is 1,130 upper limb injuries from 100,000 patients per year. The most frequent part of the injury is the finger (38.4%), and the most common injury is a fracture (29.2%) (Feehan and Sheps, 2006; Jameel et al, 2018; Lemonic, 2011; Ootes et al., 2017).

Indonesia is a country with the largest Muslim population in the world, which is recorded in 2010 with 205,126,295 Muslim residents or 88.22% of the total population in 2010 and predicted in 2020 become 232,342,367 Muslim residents or around 88.22% of the total population in 2020. Every year all Muslims in the world celebrate Eid after one month of fasting during Ramadhan so do in Indonesia. Firecrackers are still often used to celebrate Eid al-Fitr or Ramadhan in Indonesia (Feehan and Sheps, 2006; Kettani, 2010; Ootes et al., 2017; Premlal et al., 2018).

The purpose of this study was to define the clinical profile of manus fractures caused by explosions of firecrackers in the last year Ramadan and Eid (May 14 - June 15) 2018 at the Karima Utama Surgical Hospital. Knowing the quantity and pattern of fracture events can be a reference for the government to make policies and hospitals in preparation.

CASE PRESENTATION

The case study was taken from patients of Karima Utama Surgical Hospital, Surakarta, Indonesia, during Ramadan and Eid al-Fitr (from May 14 to June 15) 2018. A total of 36 patients were fractured due to firework explosions recorded in medical records during that period. Data such as gender, age and fracture diagnosis were collected in this study.

RESULTS

Within study period the diagnosed manus fracture caused by explosions of firecrackers which recorded in the medical records at Karima Utama Surgical Hospital during 2018 there were 36 patients regardless of gender and age. There is a greater prevalence of men than women 3.5: 1.

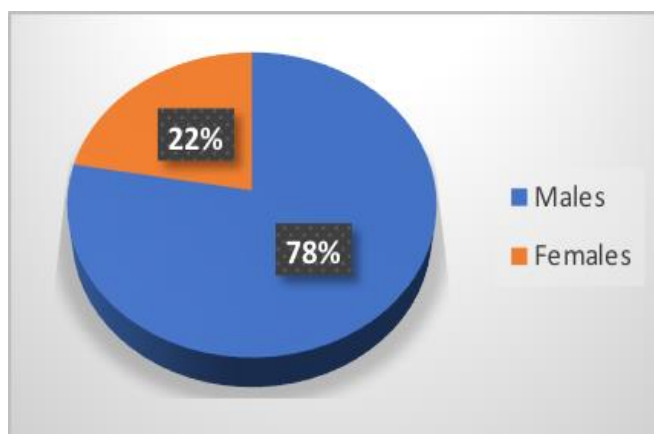


Figure 1. Gender Distribution of Samples (n = 36)

Figure 1 shows the gender distribution. Among 36 patients, there were 28 (78%) men and 8 (22%) women. Figure 2 shows the right manus fractures more often 31 (86%) than the left manus 5 (14%). Figure 3 shows that single fracture occurs more often 22 (61%) than multiple fractures 14 (39%). Multiple

fractures that occur include the amputated phalanx.

Table 1 showed age distribution of samples. Table 1 showed that the highest incidence occurs at the age of 11 to 20 years (31%) and the lowest at the age of more than 60 years (6%).

Table 1. Age Distribution of Samples (n = 36)

Age (years)	n	%
0-10	3	8%
11-20	11	31%
21-30	9	25%
31-40	6	17%
41-50	2	6%
51-60	3	8%
≥60	2	6%
Total	36	100%

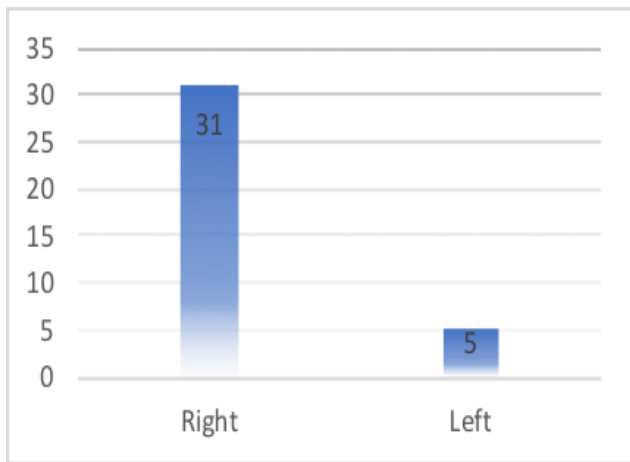


Figure 2. Fractured Manus Distribution of Samples (n = 36)

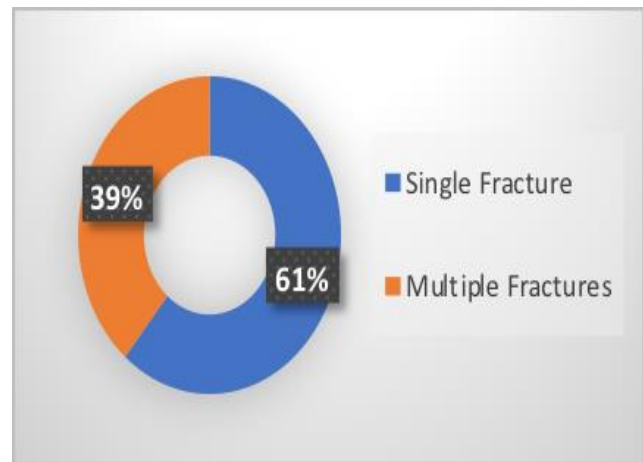


Figure 3. Distribution of Manus Fracture Types (n = 36)



Figure 4. Wounds and X-Ray of Multiple Fractures Manus Caused by Firecracker Blast



Figure 4. Wounds and X-Ray of Multiple Fractures Manus Caused by Firecracker Blast

DISCUSSION

Fireworks often used at commemorative events because the sound, light and color produced when they erupt represent happiness and excitement. Estimated 10.000 to 12.600 people are injured because of fireworks in America every year. The type of fireworks that cause the highest injury is firecrackers with the incidence rate of 30% to 67% of all cases of injury due to fireworks (Gelbart et al., 2007; Gopalakrishnan et al., 2016; Hazani et al., 2009; Une et al., 2015). The hand is the body part that most often injured by fireworks with the incidence rate around 20% to 56% of all cases. The right hand which is more dominant in the general population has a higher incidence rate of 61.50% in all cases (Gelbart et al., 2007; Hatamabadi et al., 2013; Pilling and Govander, 2016).

In the study above, it was found that men had a higher incidence rate of 28 (78%) than female 8 (22%). Higher incidence rates in male were also found in the study conducted by Gopalakrishnan et al. (2016) with 78% male patients, Rajeswari et al. (2016) with 66% male patients, Hatamabadi et al. (2013) with 87% patients, Pilling and

Govender (2016) 70.8% from all patients were male.

The average age of this study was 27.5 years with the highest incidence rate at the age between 11 to 20 years old with 11 (31%) respondents and the lowest incidence rate at the age of more than 60 years 2 (6%) respondents. This result is the same as the study conducted by Rajeswari et al., (2016) 46% of respondents aged between 13 to 20 years old have the highest incidence.

Single fractured manus more often occur in the man caused by firecrackers in this study counted 22 (61%) compared to multiple fractures 14 (39%). Multiple fractures including amputated phalanx. Research conducted by Ootes et al. (2012) states that of all firecrackers injuries 38.4% of them were injuries to the fingers.

Firecrackers are the type of fireworks that most often causes injury and hands are the parts of the body that are most often injured. In this study, it was found that men had a higher incidence of 28 (78%) than female 8 (22%). The dominant right hand has a higher incidence rate. The age group with the highest manus fractures is between 11 to 20 years 11 (31%) respondents and the age group with the lowest incidence is more than

60 years 2 (6%). The hand fractures caused by firecrackers in our study, there were 22 (61%) patients experiencing a single fracture, 14 (39%) had multiple fractures.

AUTHOR CONTRIBUTION

Pamudji Utomo and Totok Siswanto conceived of the presented idea, contributed to the design and implementation of the study. All authors discussed the results and contributed to the final manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest in this study.

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