

# Deaths due to “patpat” accidents in the Black Sea Region, Turkey

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## ABSTRACT

**BACKGROUND:** Overtime, agricultural machines have been designed appropriate to more simple needs, instead of tractors which have a wide area of use. An example of these is the “patpat,” so named because of the sound of the motor, and for which the main purpose is ploughing.

**METHODS:** A patpat is a single-axle, two-wheeled tractor with a trailer attached. In this descriptive study, the descriptive characteristics and causes of death were analyzed of case related to patpat accidents for which autopsies were performed by the Forensic Medicine Institution Trabzon Group Directorate between 2006 and 2017.

**RESULTS:** Information was retrieved from the scene of accident examination documents, and the autopsy and laboratory records. The 21 cases comprised 17 (81%) males and 4 (19%) females, with a mean age of 47.6±20.3 years (median: 57, range: 10–75 years). Of the total accidents, in 85.7% (n=18), no other vehicle was involved. Following the accident, 52.4% (n=11) of the patpats were found at the side of the road, and 33.3% (n=7) at the edge of a stream or at the bottom of a steep valley. The cause of the accident was determined to be that the patpat had overturned on a bend in 33.3% (n=7) cases and in 85.7% (n=18) of cases, the patpat was found overturned or on its side. The most common injury was being thrown from the vehicle (38.1%, n=8), and in 66.7% (n=14) of cases, the deceased was the patpat driver.

**CONCLUSION:** Patpat accidents are a serious problem because of the frequency of use of these vehicles without proper supervision and especially because of the hazardous topographical conditions where they are used.

**Keywords:** Accident; agriculture; autopsy; death; patpat.

## INTRODUCTION

In agriculture, the use of simple machinery powered by animals dates back to 4000 BC. With rapid increases in human populations, the need for agricultural produce also increased, and to meet that need, the technology of agricultural machinery was developed. In modern-day agriculture, tractors are used for many purposes, including ploughing and carrying

loads. Overtime, agricultural machines have been designed appropriate to more simple needs, instead of tractors which have a wide area of use. An example of these is the “patpat,” so named because of the sound of the motor, and for which the main purpose is ploughing. A patpat is a single-axle, two-wheeled tractor with a trailer attached<sup>[1]</sup> (Fig. 1).

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By changing the original structure, patpats are newly designed agricultural vehicles for use on rough ground and in narrow areas that are not suitable for bigger vehicles such as tractors. These agricultural vehicles are produced with a single cylinder motor and generally 10–22 horsepower, and are modified to local needs in workshops partially specialized to the region, for use in field irrigation. Patpats which are used by attaching two separate gears to the motor are not accepted under the existing laws in Turkey as a “motor vehicle,” and therefore have no number plate, license, and requirement for periodic checks for roadworthiness and are not subject to motor vehicle tax. Moreover, because of the features as an agricultural machine, patpats are forbidden in road traffic.<sup>[2]</sup> Most patpat users do not have a driving license and the vast majority have been reported to have an education level of primary school. These vehicles are preferred by farmers as they are cheap, do not require a driving license, and do not entail expenses such as tax and insurance.<sup>[3,4]</sup> Similar agricultural vehicles are still used with modifications in countries such as Russia, Macedonia, Afghanistan, and Pakistan.<sup>[2]</sup>

When patpats are used appropriate to the production purposes, technical properties, and laws, they are useful agricultural vehicles for villagers. They are widely used in West Anatolia on flat land. However, in the East Black Sea Region,



Figure 1. An example of a patpat used for carrying loads.



Figure 2. The steep unmade roads in the fields and rural areas in the region (real accident scene image).

it has become necessary to use patpats in relatively small agricultural areas because of the mountainous, rugged features of the land and the rainy climate (Fig. 2). Due to the geographical features of the region and the use of patpats other than for agricultural activities, the likelihood of accidents increases. The previous studies in literature have reported injuries and deaths as a result of patpat accidents.<sup>[2,5]</sup>

The aim of this study was to examine fatal accidents occurring with this type of vehicle with regional use and to define the case characteristics, to be able to contribute to studies for the prevention of these types of accidents.

## MATERIALS AND METHODS

In this descriptive study, the descriptive characteristics and causes of death were analyzed of case related to patpat accidents for which autopsies were performed by the Forensic Medicine Institution Trabzonrout Group Directorate between 2006 and 2017. Information was retrieved from the scene of accident examination documents, and the autopsy and laboratory records.

The data obtained from a physical scanning of the autopsy records were analyzed statistically, including the variables of age, gender, cause of death, location of the accident, year and month, whether or not the deceased was the driver, the location and position of the patpat after the accident, and the autopsy and laboratory findings. The photographs of different patpats presented in the research were obtained as a result of face-to-face interviews with farmers, manufacturers, and repairers in the region. Data obtained in the study were analyzed statistically using SPSS vn. 24.0 software. Descriptive statistics were stated as mean±standard deviation (SD), median, minimum and maximum values, number (n), and percentage (%). Approval for this study was granted by the Forensic Medicine Institute Directorate (protocol no: 21589509.2018.497, dated: July 27, 2018).

## RESULTS

Of 9222 autopsy cases performed in Forensic Medicine Institution Trabzonrout Directorate in the period 2006–2017, 0.23% (n=21) of the deaths were determined to be the result

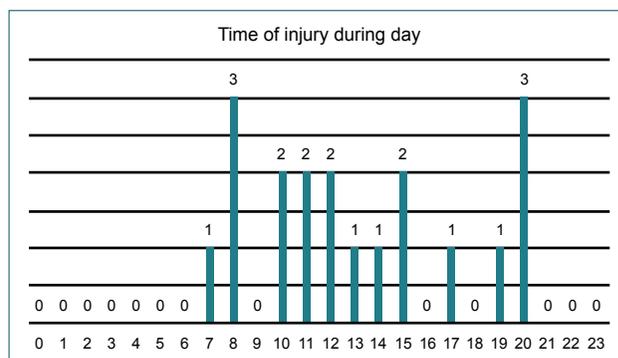


Figure 3. Time of injury during day.



**Figure 4.** A patpat that breaks into a large number of pieces due to rolling over the abyss.



**Figure 5.** A patpat that has been knocked over because of roll over.

of a patpat accident. The 21 cases comprised 17 (81%) males and 4 (19%) females, with a mean age of  $47.6 \pm 20.3$  years (median: 57, range: 10–75 years). Of the total accidents, in 85.7% (n=18), no other vehicle was involved. The times of the accidents are shown in Fig. 3.

Following the accident, 52.4% (n=11) of the patpats were found at the side of the road, and 33.3% (n=7) at the edge of a stream or at the bottom of a steep valley. The cause of the accident was determined to be that the patpat had overturned on a bend in 33.3% (n=7) cases and in 85.7% (n=18) of cases, the patpat was found overturned or on its side. Two different images of patpat accident can be viewed at Figure 4 and 5. The most common injury was being thrown from the vehicle (38.1%, n=8), and in 66.7% (n=14) of cases, the deceased was the patpat driver. Ethyl alcohol (116 mg/dL) was determined in the blood of only one case. The information related to the accidents is shown in Table 1 and Figure 6.

It was determined that 15 (71.5%) of the cases were in the cabin, 14 (66.7%) were in the driver's position, 4 (19.0%) were in the vehicle's chassis, and 2 (9.5%) were pedestrians.

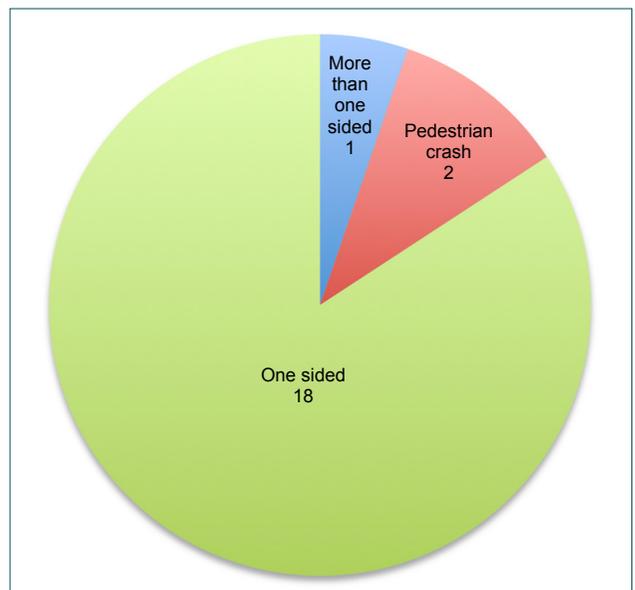
There was one person in the vehicle in 12 (57.1%) accidents and two or more persons were in the vehicle in 3 (14.3%)

**Table 1.** Features of fatal patpat accidents

|                                       | n  | %    |
|---------------------------------------|----|------|
| Place where patpat was been found     |    |      |
| Riverside, cliff                      | 1  | 4.8  |
| Field                                 | 7  | 33.3 |
| Roadside                              | 11 | 52.4 |
| Village road-dirt road                | 2  | 9.5  |
| The position of patpat after accident |    |      |
| Lying on the side                     | 13 | 61.9 |
| Upturned                              | 5  | 23.8 |
| No tipping                            | 2  | 9.5  |
| Standing up on the rear wheels        | 1  | 4.8  |
| The load of patpat                    |    |      |
| None or unknown                       | 16 | 76.2 |
| Agricultural product-crop             | 2  | 9.5  |
| Construction materials                | 2  | 9.5  |
| Agricultural equipment                | 1  | 4.8  |
| Way of injury                         |    |      |
| Flying out of patpat                  | 8  | 38.1 |
| Falling out of patpat                 | 4  | 19.0 |
| Staying under patpat                  | 7  | 33.3 |
| Pedestrian crash                      | 2  | 9.5  |

accidents. The number of people in the vehicle could not be determined in 6 (28.6%) accidents. The autopsy findings of the cases are shown in Table 2.

Three different autopsy findings have been presented at Figure 7a (multiple costa fracture after severe blunt trauma



**Figure 6.** Type of accident.

**Table 2.** Causes of death and autopsy findings

|   | n  | %    |
|---|----|------|
| <b>Causes of death</b>                          |    |      |
| Intracranial bleeding-damage                    | 12 | 60.0 |
| Chest, abdominal compression-asphyxia           | 3  | 14.3 |
| Spinal cord injury                              | 7  | 33.3 |
| Intrathoracic bleeding-damage                   | 6  | 28.6 |
| Major vessel damage                             | 1  | 4.8  |
| Intraabdominal bleeding-damage                  | 5  | 23.8 |
| Lung embolism                                   | 1  | 4.8  |
| <b>Bone fracture localization</b>               |    |      |
| None  | 1  | 4.8  |
| Skull   | 10 | 47.6 |
| Rib cage  | 10 | 47.6 |
| Spine   | 7  | 33.3 |
| Pelvis  | 1  | 4.8  |
| Upper limb                                      | 1  | 4.8  |
| Lower limb                                      | 1  | 4.8  |
| <b>The localization of injury causing death</b> |    |      |
| No traumatic findings                           | 0  | 0.0  |
| Head  | 13 | 61.9 |
| Neck  | 5  | 23.8 |
| Thorax  | 12 | 57.1 |
| Abdomen   | 6  | 28.6 |
| Upper limb                                      | 1  | 4.8  |

and displaced thoracic vertebral fracture causing complete rupture in the medulla spinalis), Figure 7b (diffuse intracerebral hemorrhage, contusion and laceration, and discrete fragmented skull fracture), and Figure 7c (widespread laser appearance in the liver) (Figs. 7a–c).

## DISCUSSION

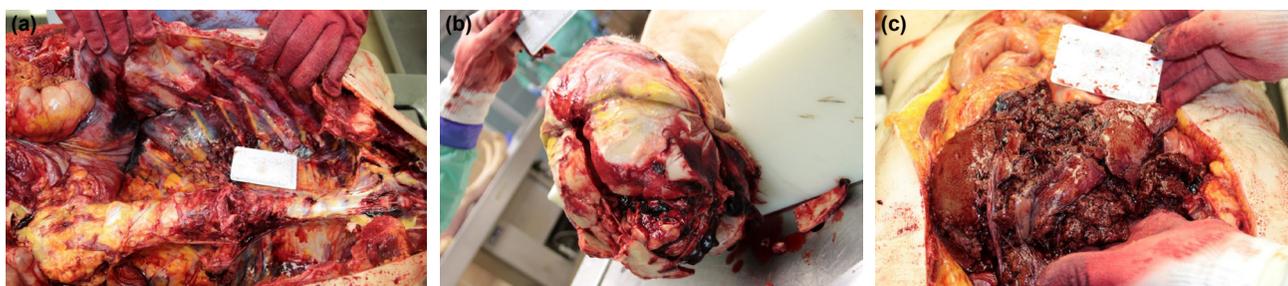
Patpat accidents are a serious problem because of the frequency of use of these vehicles without proper supervision and especially because of the hazardous topographical

conditions where they are used. According to the scene of accident reports, 85.7% (n=18) of the patpats in this study were found to be overturned or on their side following the accident. This is also seen as significant in tractor accidents, with overturning of the vehicle responsible for approximately half of tractor deaths.<sup>[6,7]</sup> The high rate in the current study can be attributed to serious problems related to the safety of the users of patpats produced from other vehicles in an uncontrolled and unsupervised manner. As no differential is used in these vehicles, the two wheels turn at the same rate going round a bend and this can cause the patpat to overturn.

Two of the cases in this series were children (10 and 12 years of age). As children are at risk of agricultural accidents and associated injuries, they should be kept away from areas of farm work to be able to prevent the deaths of children.<sup>[8–10]</sup> There should also be interventions to halt the high rate of child labor seen in the agricultural sector in Turkey. When the mechanisms of the accidents were examined, the vast majority (85.7%) did not involve another vehicle, in 9.5% of the accidents, the patpat had struck a pedestrian, and in one case, the patpat was in collision with another vehicle. The non-compliance of drivers with traffic regulations in rural areas could be a reason for accidents. In particular, the habit of taking the vehicle out of gear into neutral when descending a hill results in uncontrolled speed and can increase the possibility of accidents. Beyond the fields, which are areas of limited use, although patpats are used on roads where there are many vehicles in motion, the accidents do not generally involve another vehicle.

In two of the accidents, the patpat had struck a pedestrian and had not overturned. In both of these accidents, the pedestrian died. Despite the extremely low power of the motor and low speeds, these accidents could have been due to the greater braking distance required because of the inadequacy of the brake mechanism.

In literature, it has been reported that the vast majority of tractor accidents occur in the fields and a lesser number on village roads and main roads between towns.<sup>[8,11]</sup> In addition to the use of patpats as agricultural vehicles, it can also be seen that they are frequently used as transport. In the Black Sea Region where this study was conducted, there is an ex-



**Figure 7.** (a) Multiple costa fracture after severe blunt trauma and displaced thoracic vertebral fracture causing complete rupture in the medulla spinalis. (b) Diffuse intracerebral hemorrhage, contusion and laceration, and discrete fragmented skull fracture. (c) Widespread laser appearance in the liver.

tremely long network of roads because of the nature of the scattered settlements and rugged terrain. When the places where the patpats were found after the accidents were evaluated in this study, the highest number (52.4%) was determined to be at the side of the road. This finding confirms that patpats are used on roads, where they are not permitted. It can be considered that these accidents could be decreased with supervision and checks. A total of 7 (33.3%) accidents that resulted in death occurred in areas close to fields. This suggests that even when used in areas appropriate to the purpose for which they were produced, there is a need for revision and standardization of patpats.

Within the geographical boundaries of the area where the study was conducted, patpats are mostly used for carrying produce in hazelnut farming. The nature of the load being carried was not reported in the forensic documents of 16 of the accidents. In three of the other five, the load was agricultural produce, and in the remaining two, it was building materials. This finding confirms that patpats are used in areas other than agriculture, such as the construction sector.

In addition to carrying agricultural products and implements in the trailer of patpats, they also carry workers, and the slightest bumps in the road increase the possibility of being thrown from the trailer. Of all the cases in this study, 66.7% were the driver and 19% (n=4) were determined to have been a passenger seated in the trailer. A study by Küçükler similarly determined that 60.7% of cases were the driver.<sup>[2]</sup>

Some patpats have been designed with a closed driver's cabin, which has space for a driver and passengers. As there are no seatbelts installed or protective frame, passengers can be thrown from the cabin in an accident. In the current study, this rate was 57.1%. It was understood that 14 of 21 cases were in the driver's position when the accident occurred. This suggests that although it seems to be relatively more protected than the trailer, the driver and passengers are not sufficiently protected in the driver's space.

Of the accidents in the current study, 90.5% (n=19) occurred between the times of 07.00–21.00 h, and the time of the accident was not reported in the documents in two cases. The times at which the accidents occurred are consistent with travelling to and from work, especially during planting and harvesting seasons. The body areas most frequently injured in patpat accidents were the head and neck at a rate of 60% followed by the chest. As shown at Figures 7a and b, the main causes of fatal patpat accidents were traumas of head and chest. The abdomen was also another target as shown at Figure 7c with a laceration of liver. Like our study, the causes of deaths related to tractor have been reported to be mainly trauma to the head and chest regions also.<sup>[5,8,11–13]</sup>

Another noticeable mechanism of death is mechanical asphyxia, which can be seen in cases trapped underneath the

patpat in the accident. In two cases, the cause of death was mechanical asphyxia that developed following chest and abdominal compression, and in one of these cases, no internal organ injury or bone fractures were determined. As these accidents generally occur in rural areas far from health-care centers, death is more likely as early emergency interventions cannot be made.

## Conclusion

In this study, patpat accidents were examined, and the results showed that the deaths were due to misuse of the vehicle, non-compliance with regulations, and mechanical problems related to user safety because of unsupervised production of the vehicles. Standardization of production of these types of modified agricultural vehicles, ensuring periodic maintenance and checks, increasing driver education, the use of lights and reflectors to allow the vehicles to be seen, ensuring that they are not used out of permitted areas, compliance with laws and regulations, and not carrying greater loads or passengers than permitted, and recommendations for roads to be built appropriate to the region, would contribute to the prevention of deaths related to patpat accidents.

**Ethics Committee Approval:** This study was approved by the Ministry of Justice, Forensic Medicine Institute Presidency (Date: 27.07.2018, Decision No: 21589509/2018/497).

**Peer-review:** Internally peer-reviewed.

**Authorship Contributions:** Concept: H.Ç.K., M.Ç.; Design: H.Ç.K., M.Ç.; Supervision: H.Ç.K., M.Ç.; Data: H.Ç.K., M.A.; Analysis: M.A., H.İ.A., N.E.B.; Literature search: H.Ç.K., S.Ö., H.İ.A., N.E.B.; Writing: H.Ç.K., S.Ö., H.İ.A., N.E.B.; Critical revision: S.Ö., H.İ.A., N.E.B.

**Conflict of Interest:** None declared.

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## ORİJİNAL ÇALIŞMA - ÖZ

### Karadeniz Bölgesi'nde “patpat” kazalarına bağlı ölümler

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**AMAÇ:** Günümüzde tarımsal üretim yapan birçok yerde traktör tarla sürme yük taşıma gibi birçok amaçla kullanılmaktadır. Yaygın kullanım alanına sahip olan traktörlerin yerine zamanla daha basit ihtiyaçlara uygun tarım araçları imal edilmiştir. Çalışması esnasında çıkardığı yüksek motor sesinden ötürü “patpat” olarak adlandırılan ve asıl amacı tarla sürmek olan araç bunlara örnektir. Patpatlar römork eklenmiş iki tekerlekli tek akslı traktörlerdir.

**GEREÇ VE YÖNTEM:** Bu tanımlayıcı çalışmada; Adli Tıp Kurumu Trabzon Grup Başkanlığı'nda 2006–2017 tarihleri arasında otopsi yapılan “patpat” kazası ile ilişkili ölümlerde olay yeri inceleme belgelerindeki bilgiler, otopsi ve laboratuvar bulguları ışığında, olgulara ait tanımlayıcı bilgiler ve olguların ölüm nedenleri analiz edildi.

**BULGULAR:** Olgular ortalama 47.6±20.3 yıl (medyan: 57, dağılım: 10–75 yıl) olan 17 (%81) erkek ve dört (%19) kadından oluşmuştur. Kazaların %85.7'si (n=18) tek taraflı patpat kazası idi. Kaza sonrasında patpatların %52.4'ü (n=11) karayolunun kenarında, %33.3'ü (n=7) bir derenin kenarında veya dik bir vadinin altında bulundu. Kaza sebeplerinin %33.3 (n=7) olguda patpatın virajda devrilmesi ve %85.7'sinde (n=18) patpatın devrilmesi veya yan dönmesi olduğu tespit edildi. En sık yaralanma şekli kaza esnasında araçtan (%38.1, n=8) fırlamaydı. Olguların %66.7'sinde (n=14) ölen kişi patpat sürücüsü idi.

**TARTIŞMA:** Patpat kazaları; kullanım sıklığı, denetime elverişli olmaması ve özellikle kullanıldığı coğrafyanın zorlu şartları nedeniyle ciddi bir sorun olarak karşımıza çıkmaktadır.

**Anahtar sözcükler:** Kaza; otopsi; ölüm; patpat; tarım.

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