

## Original Research Article

# Management and pattern of pellet gun injuries in war conflicted Kashmir Valley, India

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## ABSTRACT

**Background:** The pellet gun is a shot gun weapon which is used by law enforcement agencies to maintain law and order in conflict zones whenever need arises. Sometimes, these minute sized pellets may lead to grave injuries to vital structures of the body which may sometimes led to permanent disability. The objective of this study was to investigate and manage these fatal injuries in war conflicted valley.

**Methods:** The prospective study conducted in a tertiary care hospital of Government Medical College, Srinagar, Jammu and Kashmir, India at the time of civilian unrest in 2016 and onwards when thousands of people were injured with pellets by security agencies.

**Results:** Maximum number (67.1%) of patients had injuries to eyes and face, among the total number of patients 69 (17.2%) of patients had abdominal injuries. CECT abdomen showed pellets in all 69 (100%) of patients, pellets in gut lumen in 48 (69.5%) of patients. In the abdominal group, 40 patients underwent laparotomy which showed hemoperitoneum in 49 (71.01%), pneumoperitoneum in 6 (8.69%) of patients.

**Conclusions:** Pellet gun weapon has become a common arsenal to suppress the unarmed civilian agitation which may lead to fatal injuries to vital structures of body, where prognosis remained poor despite of best available treatment.

**Keywords:** Conflict, Compressing gas, Civilians, Cartridge, Pellet gun, Pellet balls

## INTRODUCTION

The Kashmir valley which is said to be the paradise on earth is unfortunately surrounded by war of conflict with frequent unarmed agitations and frequent use of pellet gun and other lethal weapons by law enforcing agencies from time to time has killed thousands of civilians and left many more injured and disabled.<sup>1</sup> Pellet gun is a form of short gun with a 20 inch barrel operating at low

pressures as low as 50 atmospheres.<sup>2</sup> A pellet cartridge contains hundreds of pellets which use compressed air and expanding gases to propel projectiles. Air weapon injuries commonly involve teenage boys, and the damage to body can be determined by the velocity and the distance from which pellets are.<sup>3</sup> The number of pellets fired in single shot is as high as 500 in number and pellets while released from the gun don't have a predictable trajectory and can cause unexpectedly fatal injuries.<sup>4</sup>

## METHODS

This study was conducted in a tertiary care hospital of Government Medical College, Srinagar, Jammu and Kashmir, India at the time of civilian unrest in 2016 for duration of one year from July 2016 to June 2017 when thousands of unarmed people were injured with lethal pellets by security agencies. In this study, 400 hundred patients were included. All pellet victims were received in the casualty with immediate attention to airway and any excessive bleeding. After initial stabilization and resuscitation, the patients who were send for Focussed Assessment Sonography for Trauma (FAST Scan) done in the emergency room by the radiologist and after resuscitation were sent for a CECT chest, abdomen and pelvis and radiological examination of other parts of body as required. Patients were classified on the basis of distribution of pellets on body and radiological investigations. Injuries to eyes and limbs were shifted to their respective departments for specialized treatment. Patients with pellet injury to abdomen were managed in surgical department and were operated on the basis of repeated clinical examination, hemodynamic instability and CECT based evidence of haemoperitoneum or pneumoperitoneum.

## RESULTS

Maximum number (67.1%) of patients had injuries to eyes and face, chest was involved in 9 (2.25%) of

patients. Among the total number of patients 69 (17.2%) of patients had abdominal injuries (Table 1).

**Table 1: Distribution of pellets on body.**

Anatomical site	Number	Percentage
Eyes and face	270	67.1%
Head and neck	32	8%
Extremities	24	6%
Chest	9	2.25%
Abdomen	69	17.2%

CECT abdomen showed pellets in all 69 (100%) of patients in parietal wall, pellets in gut lumen in 48 (69.5%) of patients, haemoperitoneum in 49 (71.01%) and pneumoperitoneum in 6 (8.69%) of patients (Table 2).

**Table 2: Abdominal CECT findings.**

CECT finding of abdomen	Number	Percentage
Pellets in parieties	69	100%
Intrabdominal pellets	62	89.8%
Pellets in gut lumen	48	69.5%
Pellets in solid organs	26	37%
Haemoperitoneum	49	71.01%
Pneumoperitoneum	6	8.69%
Retroperitoneal haematoma	2	2.89%
Solid organ lacerations	Nil	-

**Table 3: Intraoperative findings with management.**

Operative findings	No. of patients	%	Procedure performed
Bowel perforation	10	25	Closure of small bowel perforations
Serosal breach only	34	85	Closure with lavage
Mesenteric hematoma	2	5	Peritoneal lavage
Gastro colic hematoma	1	2.5	Ligation of bleeding vessel in omentum
Splenic hilar injury	1	2.5	Splenectomy
Serosal breach liver	3	7.5	Hemostasis of bleeding pellet wounds
Mesenteric hematoma with unhealthy bowel	4	10	Resection anastomosis of small bowel
No significant finding	5	12.5	Negative exploration



**Figure 1: A) Multiple pellets over back with oozing of blood. B) Showed pellets over back who had pellets in liver and bowel lumen on exploration.**

In the abdominal group, 40 patients underwent laparotomy which showed serosal breach in maximum number 34 (85%), which was managed with closure and lavage. Bowel perforation was seen in 10 (25%), which was treated with primary closure. 4 (10%) of patients had mesenteric hematoma with unhealthy bowel who underwent resection anastomosis of small bowel as blood supply was compromised due to hematoma formation and color changes in bowel. Splenic hilar injury was seen in 1 (2.5%), who underwent splenectomy (Table 3). Figure A, B, C and D showed multiple pellets over back with oozing of blood, X-ray chest with multiple pellets, and pellet in descending colon respectively.



**Figure 3: X-ray chest with multiple pellets.**



**Figure 4: Arrow showed pellet in descending colon.**

## DISCUSSION

Firearm injuries can be classified as penetrating, perforating or avulsion. The injuries inflicted by these weapons are usually accidental injuries in paediatric age group and target organs are mostly delicate eyes, blood vessel.<sup>5</sup> Urgent specialist referral is indicated for cranial, ocular, chest, abdominal, or vascular injuries as they may require emergency surgery. Cardiac injuries may be rapidly fatal, penetrating abdominal injuries involving hollow viscera or major blood vessels need prompt exploration and repair. A pellet cartridge contains hundreds of metallic balls which may lead to injuries from minor to fatal one.<sup>6</sup> A classical pellet wound can be described as a small puncture wound 3-4 mm in diameter with oozing of blood from the puncture site. Accordingly, to Thorsby and Darlow bullets inoculated with a heat labile organism fired through sterile nutrient enriched gelatin will produce bacterial growth along the entire length of tract.<sup>7</sup> A foreign body ideally should be removed otherwise it may lead to recurrent infection, fistula formation, embolism or poisoning.<sup>8</sup> In this study, all the 400 (100%) patients had multiple pellet injuries including abdomen wall. CECT abdomen showed pellets in 69 (100%) of patients in parietal wall, intrabdominal

pellets in 62 (89.8%), pellets in solid organs in 26 (37%). In this study, 40 patients underwent laparotomy with multiple findings with serosal breach in maximum number of patients and negative laparotomy in 5 (12.5%). In a study conducted by Mushtaque M et al, showed negative laparotomy in 4 patients with pellet injuries to abdomen.<sup>9</sup> In this study, 29 out of 69 were managed conservatively despite of CECT documented pellets in parietal wall and abdominal cavity including bowel wall. In this study, 4/40 patients underwent delayed laparotomy after 24 hours.

In a study conducted by Hegazy TO et al, had 4/23 patients operated after 24 hours and all had hollow viscus perforations.<sup>10</sup> In this study, 44 patients had involvement of bowel with small bowel in maximum number, followed by multiple mesenteric haematoma, and involvement of solid viscera (liver, spleen). In a study conducted by Chamisa I showed small bowel involvement in (59%), colon (37%), liver (25%) and stomach (22%) and the injuries to small bowel being perforations and tangential lacerations, requiring resection (26%) and simple closure (74%).<sup>11</sup> A study conducted by Wani ML et al, has reported a number of vascular injuries due to non-lethal weapons like pellets and tear gas shells in a conflict zone.<sup>12</sup> Most of the patients were anxious in the follow up that the embedded pellets in their body can kill them for which psychiatric counseling was needed to relieve their anxieties.

## CONCLUSION

Pellet gun like weapons are as harmful as other firearm weapons and should be immediately banned on humans by court of law as this weapon can cause lethal injuries especially to vital structures to our body which can lead to permanent disability, besides the word so called non-lethal weapon for pellet gun should be changed to lethal weapon and should be not used by law enforcing agencies in future.

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