

Peritoneal Lavage in Children with Blunt Abdominal Trauma

F. A. NWAKO

University of Nigeria Teaching Hospital, Enugu

Summary

Nwako, F. A. (1978). *Nigerian Journal of Paediatrics*, 5 (2), 30. **Peritoneal lavage in Children with blunt Abdominal Trauma.** Quantitative peritoneal lavage was performed in 18 children with blunt abdominal trauma to determine the presence of intra-abdominal injuries. A strongly positive lavage was 100 per cent accurate in the diagnosis of an intra-abdominal injury requiring surgical operation. A negative lavage demonstrated absence of a significant intra-peritoneal injury with 100 per cent accuracy. A weakly positive lavage was not diagnostic and required additional evaluation, including intravenous pyelography and arteriography. Peritoneal lavage was found to be safe and much more accurate than physical examination in diagnosing significant intra-abdominal injury.

TRAUMA is one of the leading causes of mortality and morbidity in children (Halter and Gross, 1957). Prompt diagnosis and treatment can help lower morbidity and mortality. Children with blunt abdominal trauma are often difficult to evaluate at the initial examination since the signs of their injury may be delayed; furthermore, the results of such injury, particularly to solid viscera, are often difficult management problems.

A prospective study of the effectiveness of peritoneal lavage in the diagnosis of significant injury in patients with blunt abdominal trauma was conducted in the department of Paediatric Surgery, University of Nigeria Teaching Hospital, Enugu, between April 1972 and March 1973. This communication reports the results of this procedure carried out on a number of children with blunt abdominal trauma.

Materials and Methods

Children sustaining blunt abdominal trauma were clinically evaluated and divided into three categories based on the physical findings:

1. Patients who require immediate surgical operation.
2. Equivocal cases, i.e., patients with inconclusive physical findings.
3. Patients who require no operation.

Peritoneal lavage was performed on the equivocal cases employing the simple method of Root, Hanser and McKinley (1965). Proper informed consent was obtained from the parents in each case. The urinary bladder was decompressed and after adequate skin preparation, either a dialysis catheter or a multiperforated polythene tube was positioned in the peritoneal cavity via a trocar inserted through a small infra-umbilical incision. Normal saline or Ringer's lactate solution (20 ml/Kg body weight—maximum 500 ml) was rapidly infused. The fluid was allowed to drain by gravity into an empty bottle. The result of peritoneal lavage depends on the visual appearance of the fluid. The lavage was regarded as negative if the fluid in the collecting bottle appeared colourless. If blood was present,

the fluid was thoroughly mixed and allowed to pass through a standard intravenous infusion plastic tubing. The amount of intra-peritoneal blood in the lavage effluent was estimated by the simple technique of reading a newsprint through the tubing. If the newsprint could be read through the tubing, the lavage effluent was weakly positive. If the newsprint could not be read, the lavage was considered strongly positive. No other quantitative colorimetric method was employed.

Patients were divided into 3 treatment groups depending on the results of the peritoneal lavage:

1. Prompt exploratory laparotomy was performed if the result of the lavage was strongly positive.
2. Further diagnostic evaluation was carried out (arteriography and intravenous urography) if the lavage was weakly positive. Patients with positive findings thereafter underwent an operation, while those with normal findings were closely observed.
3. Close observation was instituted for 24 hours if the peritoneal lavage was negative.

Results

Peritoneal lavage was performed in 18 children, aged 6 months–12 years. Of these children, the lavage was strongly positive in 12, weakly positive in four and negative in two. All 12 patients with strongly positive lavage had significant intra-peritoneal injuries (Table 1) requiring prompt laparotomy. The four patients with a weakly positive lavage had further investigations and were safely observed. There were no significant intra-peritoneal injuries in the two patients with negative lavages.

The significant associated injuries are shown in Table II. Solid visceral injuries were more common than injuries to hollow viscera. Many patients had significant extra-abdominal injuries.

TABLE I

Organs Injured in 12 Children with Strongly Positive Lavage

<i>Organ</i>	<i>No. of Cases</i>
Spleen	5
Liver	2
Pancreas	1
Kidneys	1
Duodenum	1
Jejunum	1
Vena Cava	1

TABLE II

Associated Extra-Abdominal Injuries in 12 Patients with Strongly Positive Lavage

<i>Type of Injury</i>	<i>No. of Cases</i>
Lung	1
Pneumothorax	1
Concussion	4
<i>Fractures:</i>	
Ribs	4
Upper extremity (Humerus) (Radius) (Ulna)	5
Pelvis	2
Femur	5
Lower leg (Femur) (Tibia)	2
Skull	2

The youngest patient in the present series to undergo lavage was a six-month old infant involved in a road traffic accident. The lavage in this child was negative. Peak incidence of significant intra-abdominal injuries occurred in the age group, six to twelve years old.

Eight of twelve patients who required laparotomy were operated on within six hours of their initial assessment, while two other patients underwent laparotomy 8 hours after. While being prepared for laparotomy, one of these 2

patients showed increasing abdominal tenderness and an associated upper abdominal rigidity suggestive of a pancreatic transection, which lesion was proven at laparotomy.

There were no major complications of peritoneal lavage in the entire group. However, several minor wound complications such as haematomas and superficial wound disruptions occurred but generally did not prolong either recovery or hospitalisation. All 18 children recovered from their injuries although several patients with multiple severe injuries had long hospital admissions.

Discussion

Intra-abdominal injuries in children with blunt trauma differ from those in adults in several aspects. First, pain in children produces acute apprehension. Secondly, anxiety is easily transferred by the parents to their children. Thirdly, the fear of physicians and the hospital environment often make clinical evaluation of the child difficult. Under these circumstances we have found physical examination of the bluntly-injured abdomen unreliable. Abdominal pain and tenderness may be caused by abdominal wall contusion or reflex rigidity due to pelvic or chest trauma.

Four quadrant tap has been recommended to detect haemoperitoneum (Orlando and Moore, 1972). However, this procedure is of value only if it is positive. A negative tap does not exclude peritoneal lavage. Our experience confirms that peritoneal lavage is an accurate, simple, safe and rapid (it takes about 20 mins) diagnostic method in children with abdominal injuries (Root, Hauser and McKinley, 1965). Peritoneal lavage accurately indicated the need for operation while initial physical examination was much less accurate. All 18 patients were thought to have equivocal surgical abdomens on admission. All 12 patients with strongly positive lavage were found to have significant injuries

confirmed at laparotomy. None of the two patients with negative peritoneal lavage was found to have a significant injury after further investigations. Unnecessary laparotomy was thereby avoided in at least 6 patients with indefinite clinical signs of an acute abdomen.

Peritoneal lavage has been criticised as being too sensitive for detection of haemoperitoneum (Perry, 1970). This has not been confirmed by the present study. If the simple technique of quantitating the lavage by the degree of opacity is employed, unnecessary laparotomy is avoided. We are in agreement however, with the statement that peritoneal lavage is not reliable for retroperitoneal injuries (Olsen, Redman and Hildreth, 1971). We suggest that when retroperitoneal injury is suspected, other diagnostic methods such as intravenous pyelography, arteriography, etc. must be considered. However, retroperitoneal injuries do not carry the same onerous note as intraperitoneal injuries with peritonitis.

Major complications due to peritoneal lavage have been reported such as bladder, bowel, and major vessel perforation (Caffe and Benfield, 1971). These complications can be minimised by complete evacuation of the bladder and careful surgical technique, including actual display of the linea alba prior to the lavage. Because of the simplicity of peritoneal lavage even house-staff in paediatric medicine are confident in performing this procedure.

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