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ABDOMINAL INJURY FROM SPORTING ACTIVITIES

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ABSTRACT

The frequency of abdominal injury is rising. In an analysis of 1,354 cases of closed abdominal trauma sustained during a 30-year period (1950-1979) in Skaraborg County, Sweden, a distinct increase was found in the numbers associated with sporting activities. The severity of the injuries caused by sports likewise showed an increase. The representation of injured organs was of the same order as in the total series of closed abdominal injuries. An analysis of the 136 cases of sports-associated injury is presented with regard to cause and type of the injuries, diagnosis and prognosis.

INTRODUCTION

Sports-associated injuries, primarily orthopaedic, have been discussed in many published studies. None so far has focused on abdominal injury.

A review of abdominal injuries over a 30-year period in the Swedish county of Skaraborg showed a clear increase in sporting activities as causal factors (Bergqvist et al, 1981). Altogether 136 cases with such causation were revealed by the review. They are further analysed in the present report. This county lies between the great lakes Vänern and Vättern, contains several industrial towns and has a population of 268,700.

MATERIAL AND METHODS

The medical records concerning all patients hospitalised for abdominal injury in Skaraborg County between 1950 and 1979 were reviewed. They showed 1,354 cases of closed injury, including 136 (10%) incurred during sporting activities. For the special analysis, these 136 patients were grouped into 10-year periods according to year of injury.

Statistics from the regional Amateur Athletic Federation showed that the number of sports clubs in the region doubled from 600 during the period of the review. The concomitant overall increase in membership was five-fold, from 45,000 to 242,000 while football club membership increased four-fold, from 17,500 to 70,000.

RESULTS

An appreciable increase was found in the number of persons incurring abdominal trauma from sporting activities during the 30-year review period (Fig. 1). Of the 136 injured persons, only 21 (16%) were female. Horse-riding accounted for 11 of these 21 accidents and was the only sport in which more than half of the injured persons were female. The dominant age group was 10 to 20 years (Fig. 2). Only a few patients were older than 35 years.

The seasonal incidence of the injuries was highest in the month of May, but there was a minor peak in

Fig. 1. Number of patients with sports-associated abdominal trauma in the 30-year study period.

Fig. 2. Age distribution of the 136 patients with sports-associated abdominal trauma.

February (Fig. 3). Winter sports were the main cause of the injuries in February and football dominated in May. In Scandinavia football is a summer game.

Football playing was by far the most common cause of abdominal injury (Table I). There were 21 horse-riding accidents, but only four in track and field athletics. Motor car or motorcycle competitions caused six abdominal injuries.

Many of the injuries consisted of abdominal contusions (Table II). Kidney damage likewise occurred in almost half of the patients. Injuries to the gastrointestinal tract were rare. Intra-abdominal parenchymal organs were involved in altogether 16 per cent of the cases, with damage to the spleen in 15 cases, to the liver in six and to the pancreas (contusion) in one case.

Associated extra-abdominal injuries occurred in only 16 of the 136 patients. They were mostly rib fractures

Fig. 3. Incidence of sports-associated abdominal trauma according to calendar months.

TABLE I

Activities in which 136 sports-associated abdominal injuries ensued.

	No. of patients
Football	65
Horse-riding	21
Ice hockey	20
Skiing	8
Gymnastics	8
Motor car competitions	2
Motorcycle competitions	4
Other sports activities	8
Total	136

TABLE II

Nature of sports-associated abdominal injuries in 136 patients (in nine cases combined injuries were seen).

Injury	Number of injuries					Total in sports series
	Foot-ball	Horse-riding	Ice hockey	Skiing	Other	
Abdominal contusion	24	12	11	1	12	60
Damage to kidneys	34	5	8	5	7	59
spleen	5	3	1	2	4	15
liver	1	3	1	—	1	6
gallbladder	—	1	—	—	—	1
small intestine	2	—	—	—	1	3
pancreas	—	—	1	—	—	1
Total number of patients	65	21	20	8	22	136

sustained in football games. Of the 16 patients with extra-abdominal injury, 12 were from the third decade of the study, 1970-79.

The abdominal symptoms on admission to hospital were usually undramatic. Tenderness was reported in the upper abdomen by 74 patients and over the kidney region by 54. Clinical signs of peritonitis were present in only eight cases, all but one of them again from the third decade of the study.

Surgery was performed in 32 cases (23% of the series). Four of the 15 splenectomies were done more than 48 hours after injury. In all four patients the abdominal symptoms were mild initially but increasing distress led to surgical exploration, directly in two cases and after diagnostic angiography in the other two.

Kidney injuries required surgery in five cases. In two the renal rupture could be closed by primary suture. In a third patient there was bleeding from a congenitally malformed kidney and heminephrectomy had to be performed. Nephrectomy was necessary in two cases. In the heminephrectomised patient a second exploration was made for suspected recurrence of bleeding which, however, could not be confirmed. Ileus arose from adhesions following this exploration, and three more abdominal operations were required before the patient finally was discharged from hospital.

The six liver injuries were treated by primary suture. One of the patients also had rupture of the gallbladder. Incomplete primary haemostasis necessitated re-exploration and further suture in one case, after which there were no complications. A gallbladder abscess formed post-operatively in another of the patients with liver

damage. The abscess was drained, but subsequently the right liver lobe had to be resected because of recurrent bleeding. After this operation the course was uneventful.

The three ruptures of small intestine were primarily repaired. In the patient with pancreatic contusion a drain was inserted. A fistula developed but closed spontaneously after 14 days of conservative treatment.

None of the 136 patients died as a result of the injuries.

DISCUSSION

Our analysis of all hospitalised cases of closed abdominal trauma in the Swedish county of Skaraborg over a 30-year period revealed a distinct rise in the numbers caused by sporting activities. Such injuries comprised 10 per cent of the total of the study period (Bergqvist et al, 1981). This agrees with frequencies in other studies (Aho and Rastima, 1971; Wilson, 1963). Adolescents predominated as regards age, and football was the main sport. Horse-riding accidents accounted for 21 of the 136 cases and, in contrast to other causes, showed a female preponderance. Skiing accidents were involved in only eight cases, with five in downhill coursing in the last five years of the study.

Numerous organs were injured and surgery was required in 23 per cent of the cases. The frequency of operative treatment corresponds with that in closed abdominal trauma in general, in which motor-traffic accidents (high-energy injuries) predominate as causal factors in our experience. A possible explanation of this similarity is that compression of a relatively small body area (elbow, knee, etc.) is common in sports injuries. Compression of a small abdominal area readily causes damage even in relatively low-energy injuries (Cooke and Meyer, 1964). The suspicion of organ damage should thus be stronger in cases of this type than in other types of low-energy injuries.

The recognition of intra-abdominal damage in persons injured in sporting activities is often delayed by unwarrantedly low index of suspicion. An increased use of diagnostic peritoneal lavage is often recommended, particularly in patients with increasing abdominal distress (DuPriest et al, 1979; Lamke and Varenhorst, 1977). The interval between trauma and surgical exploration may thus be reduced in many cases.

Splenectomy was performed in 15 of the 136 patients, in four of them after a few days observation. By definition, these four patients had delayed splenic rupture (McIndoe, 1931). All four, however, presented initially with abdominal symptoms, which subsequently increased and led to surgical exploration, in two cases after angiography. Such late-diagnosed injuries often

consist of small rifts in the spleen with little intra-abdominal bleeding and few symptoms. They are not true delayed ruptures (Olsen and Polly, 1977; Bergqvist et al, 1980).

The large number of injuries in the month of February, particularly in connection with winter sports, presumably was mainly attributable to the Swedish schools mid-term break, a week in which many sporting events are arranged. Less readily explainable is the high frequency of abdominal injuries associated with football playing in the month of May as compared with the rest of the football season (summer in Sweden). One possibility is that football players are in poorer condition at

the start of the season.

The past 30 years have seen a great increase in membership of sports clubs, including football clubs. In the last ten years of this period there has been an even sharper increase in injuries connected with sporting activities. This rising incidence, and also an increase in associated extra-abdominal injuries and cases with clinical signs of peritonitis, occurring mainly in "contact sports" such as football, may be explainable by a more aggressive and more compact style of play. Many of the injured were young adolescents. The altered style of play seems to apply to contact sports also in this age group.

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