Middle Articles

HOSPITAL TOPICS

A Children's Casualty Department

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Accident and emergency services have received detailed attention in a number of recent reports, and these have shown that children account for about one-quarter of the work done in casualty and accident departments. Very little accurate information is, however, available about these children. At a time when many centralized accident units are being planned it seems worth while recording the work coming to the casualty department of a children's hospital during one year.

The Royal Aberdeen Hospital for Sick Children is the only hospital for children in North-east Scotland, an area which contains about 450,000 inhabitants. The casualty department of the hospital, which is always open, provides accident and emergency services for children under the age of 12 years living in and around the City of Aberdeen. This area has a population of about 215,000 people, among whom, at the 1961 census, there were some 41,000 children under the age of 12. Nearly all accidents requiring medical attention which occur among these 41,000 children are seen in this casualty department. Children who live more than 10 miles (16 km.) beyond the city centre are likely to be seen first by their family doctor: if admission is needed they will come direct to the wards of the hospital and will not be included in the casualty department statistics. Some children who live within the city area will also be seen by their family doctor, but if they need radiographic examination or outpatient treatment of a surgical nature they are generally referred to the department. We believe, therefore, that this account will give a fair picture of the accidents and emergencies arising among children living in or near a city of almost a quarter of a million inhabitants.

The Survey

Between 1 December 1964 and 30 November 1965 a special record card was completed for every new patient attending the department: 8,816 new patients were recorded. Return visits were not noted in this survey: they numbered 7,440 during the year.

The 8,816 new patients came from a total child population of about 41,000. Though some children were seen more than once, this means that one child out of every five in the area required to attend the department during the year. Ehrenpreis (1957) was surprised to find that one child in every 10 in Stockholm was seen in a hospital casualty department during the year 1955.

During the period of the survey some 30,000 new patients were seen at the casualty department of the Royal Infirmary, which serves the 174,000 people in the area who are over 12

years of age. Thus 17% of the older population and 21% of the children of the area attended the two casualty departments, and 23% of all attendances in them were made by children.

The days of the week, from Monday to Saturday, are equally busy, 24-26 new cases being seen on each day on average. On Sunday the average figure falls to 20.

The summer months produce the main load of work. In June, July, and August 2,900 new cases were seen, which is twice the number (1,460) seen during December, January, and February. This is reflected in the number of admissions to the various wards, which varied from 100 during June to 38 during November.

The time of day at which new patients present varies greatly between summer and winter. Two nine-week periods were analysed—from 1 December to 1 February and from 27 June to 28 August. During the winter a moderate number of patients came during the morning, but most came between 2 and 5 p.m. In the summer the department was busy from 9 a.m. to 10 p.m.; the busiest hour was between 7 and 8 p.m., and substantial numbers arrived up to lighting-up time, which is about 10 p.m.

These times find no parallel in the survey of two children's hospitals in Paddington recorded by Gampel (1965), but correspond exactly with the experience of Zollinger *et al.* (1962) in Columbus, Ohio.

Waiting times were analysed for the months of December and June. In December 70% of patients were examined within 10 minutes and 86% within 20 minutes of arrival in the department. In June 70% were seen within 20 minutes and 85% within half an hour of arrival. After examination 50% of patients had left the hospital within 10 minutes and 75% within half an hour of being seen by a medical officer. Those who remained longer needed both radiographic investigation and minor operative treatment.

The department is normally staffed by a surgical registrar during the day and by a house-officer during the evening and night. When a house-officer is on duty he is encouraged to call for the advice of the duty surgical registrar, who is in the hospital, and he, in turn, can speedily obtain the consultant surgeon on duty. This level of staffing gives a satisfactory service during the winter and during the day in summer. Additional help is needed in the summer evenings, and attention is being given to this.

Age.—Relatively few babies under the age of 1 year were seen. Only 3% of attenders were in this age group, though it contains 9% of children under the age of 12. On the other hand, children between 2 and 3 years of age also make up 9% of the child population, but were responsible for 12% of new attend-

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ances at the department. There is then a downward trend, all ages from 5 to 9 years producing less than their expected proportion of work. Finally, children of 10 and 11 years of age appeared in larger numbers than would be anticipated. Zollinger *et al.* (1962) also show this high incidence of accidents around 2 years of age, and MacQueen (1960), in a survey of home accidents in Aberdeen, confirms the liability of the pre-school child to accidental injury.

Mode of Reference.—Of new patients 84% arrived unheralded. Family doctors referred 13% to the department, the number remaining fairly constant throughout the year—about 80 a month during winter and 110 a month in summer. Casual attendances, by contrast, averaged 400 during a winter month and 800 a month during the summer. Police brought in 146 (1.5%) patients during the year, and 128 arrived by ambulance. Police cases were noticeably more frequent in July and August.

Both Gampel (1965) in Paddington and Fry (1960) in South London found a much higher percentage of patients referred to casualty departments by family doctors—they give figures of 30% and 24% respectively. This difference can be explained only in terms of local custom, and we believe that the discrimination of our patients is fairly accurate: Aberdonians tend to use the casualty department for accident cases which require radiographic investigation or surgical treatment—that is, those cases which the family doctor would probably refer to hospital. Few of the patients that we saw would have been more suitably treated by their practitioners. In this connexion it is interesting to note that an appreciable number of children—some with injuries of the magnitude of a fracture of an upper limb—find their own way to the department without the help of an adult.

Site of Accident.—In 3,989 cases (45% of the total seen) the children were injured or taken ill at home. These incidents occurred more often in the summer, 417 new cases coming up on average each month between May and October, compared with an average of 250 a month for November to April. These figures agree with MacQueen's (1960), and give no support to the belief that home accidents are more common in the winter. Similar seasonal trends are seen in road traffic accidents, which accounted for 7% of new attendances: 379 children were injured on the roads between May and October, 217 between November and April. The December and January figures were much the lowest.

Medical Work of the Department

Some children had more than one condition, so that in the 8,816 children a total of 9,767 conditions were seen. Of these, 4,058 (41%) were open wounds or abrasions, which were much the commonest injuries: the majority were minor, needing simple toilet and suture, or a dressing. Closed injuries—termed contusions—numbered 2,463 (25% of the total). These were mainly injuries to the limbs not causing fracture, and a fairly large group of closed head injuries. Zollinger *et al.* (1962) found that these two groups of injuries made up 67% of their series; in ours they account for 66%.

Injuries of an orthopaedic nature—fractures, dislocations, injuries and diseases of joints, and injuries to nerves and tendons—numbered 1,899 (20% of all conditions seen).

Burns and scalds, septic conditions, and foreign bodies in various sites make up three groups of more or less equal size, each about 5% of the total number of conditions seen. Burns and scalds occurred with the same frequency throughout the year.

Children with medical conditions were not numerous—380, or 4% of all children seen—but cases of poisoning and pneumonia, and of various acute conditions presenting as convulsions, comprised some of the most seriously ill children to attend the department. Speedy resuscitation and admission

was often vital. It is interesting to compare the small number of medical cases in this department with the report of Gampel (1965) that 64% of all cases seen in Paddington were medical; we conclude that his department was being used as a substitute for the family doctor. The vast majority of medical patients seen by us were genuine emergencies which could not reasonably wait until the family doctor's next surgery.

The numbers of children considered to be the responsibility of the E.N.T. department (365) and of the ophthalmic department (312) were very similar.

The anatomical classification shows how large a proportion of childhood injuries affect the head and face, and the upper limb. Each group numbers over 3,000, and together they make up 66% of all lesions. The upper limb is four times more liable to injury or sepsis than the lower limb. Though abdominal surgery makes up a large part of general surgery, abdominal problems in the casualty department are not numerous (191), and are usually associated with the swallowing of foreign bodies. However, some gravely ill children who had closed abdominal injuries came within this group.

Treatment

The most frequently employed treatment was simple cleaning and dressing of a wound, done on 2,410 occasions; 1,710 lacerations were sutured, almost all under local anaesthesia; 216 incisions were made into septic lesions. Plasters were applied in 384 cases without anaesthetic: it was the policy of the department to admit all patients needing manipulation of a fracture under general anaesthesia. A booster dose of tetanus toxoid was given to 1,648 children, only 11 receiving anti-tetanic serum. Injections of a long-acting antibiotic—usually Triplopen—were given to 527 children with a septic lesion. Gastric lavage was used for 75 children who had swallowed harmful substances.

Admissions

One in every 10 children seen in the casualty department needed admission (864 children admitted among 8,816 seen): 466 (54%) came under the care of the general surgeons and 267 (31%) under the orthopaedic surgeons.

The common surgical reasons for admission were: (a) 154 fractures of the upper limb and 99 fractures of the lower limb, for manipulation and immobilization; (b) 182 lacerations or contusions needing observation, and usually excision and suture under general anaesthesia; (c) 138 cases of head injury in which consciousness had been lost; (d) 70 patients with a septic lesion, most having an abscess incised; (e) 40 children with burns or scalds extensive or deep enough to need care in hospital; (f) 25 abdominal problems—cases of acute abdominal disease, closed abdominal injury, or swallowing of sharp foreign bodies; five children had a rupture of the spleen, one a rupture of the kidney, and one ruptures of the spleen, adrenal, and kidney; (g) 34 children were admitted with emergencies in the ear, nose, or throat, and 18 with ophthalmic emergencies.

Children seen to be gravely ill on admission were immediately transferred to the main theatre suite of the hospital, where a room is always in readiness for resuscitation and the provision of respiratory assistance.

Medical emergency cases seen in the department accounted for 76 (9%) admissions. A high proportion of these children needed urgent and vigorous treatment.

Two deaths occurred among the 864 children admitted, both being due to severe brain damage which did not respond to surgical treatment.

Of the 864 children admitted 45% were under 5 years of age, which emphasizes the frequency of accidents in the pre-school child.

During the year of the survey 2,000 children were admitted to surgical and orthopaedic wards of the hospital; of these, 733 (37%) came from the casualty department. Rickham (1962) found that 33% of surgical and orthopaedic admissions to the two children's hospitals in Liverpool were accident cases.

Conclusions and Discussion

We believe that a children's casualty department, as described here, offers a useful service to the community, and that it complements the work of the family doctor. Minor conditions can be fully investigated and treated in good conditions, with expert nursing assistance. The work involves all the departments of the hospital, but general surgical conditions predominate. Although 84% of new patients are casual attenders, times of heavy attendance can be anticipated.

Children of pre-school age account for nearly half the work of the department and of the subsequent admissions to wards. This is a group which particularly needs the expert touch of nurses and medical staff who devote their time to the care of children.

Accidents constitute an important part of the work of a children's hospital, being responsible for more than one-third of all surgical admissions.

We have been repeatedly impressed with the value to the child of the casualty department being within a children's hospital. Expert specialist advice is easily available to the casualty officers, the shocked or frightened child is received by nurses experienced in their care, and the gravely injured child goes to wards and theatres which care every day for babies and children undergoing major surgery. The paediatric anaesthetist has the apparatus immediately to hand for his specialized tasks, including the mechanical ventilation of small children. The resident staff are practised in the collection of blood samples and in the technique of intravenous therapy in children. All these skills, immediately available because they are employed

day by day in the other surgical work of the hospital, count heavily when cases of major injury are admitted.

We therefore strongly endorse, from our experience, the advice of the Osmond-Clark Committee on Accident Services (1965) that all children who are admitted as a result of an accident or emergency should go to a children's ward. If this is within a children's hospital so much the better, for there "the facilities for the treatment of injured, poisoned, and burnt children will be best."

Summary

The work coming to the casualty department of a children's hospital from a known population during one year is described. The pre-school child is especially liable to injury.

The conditions seen come predominantly into the field of general surgery. One patient in every 10 requires admission to hospital, nearly half of whom will be under 5 years of age. Children's accident units should be placed, wherever possible, within children's hospitals.

Dr. David Proctor gave us valuable advice during the planning of this survey. We thank Dr. D. P. Dhall and the house-officers of the hospital for their assistance in completion of record cards. We thank Sister M. L. Anderson and Sister M. M. E. Duguid and their staff for much help throughout the survey. Miss Marion Fordyce, Research Secretary, carried out most of the numerical analysis of the cards.

REFERENCES

- Accident Services of Great Britain and Ireland (1965). Second Report of Review Committee. London.
 Ehrenpreis, T. (1957). *Arch. Dis. Childh.*, **32**, 495.
 Fry, L. (1960). *Lancet*, **1**, 163.
 Gampel, B. (1965). *Med. Care*, **3**, 222.
 MacQueen, I. A. G. (1960). *Home Accidents in Aberdeen*. Livingstone, Edinburgh.
 Rickham, P. P. (1962). *Arch. Dis. Childh.*, **37**, 209.
 Zollinger, R. W., Creedon, P. J., and Sanguily, J. (1962). *Amer. J. Surg.*, **104**, 855.

CONFERENCES AND MEETINGS

World Congress of Psychiatry

[FROM A SPECIAL CORRESPONDENT]

The fourth World Congress of Psychiatry was held in Madrid on 5-10 September under the presidency of Professor JUAN LOPEZ IBOR (University of Madrid).

Dr. S. KETY (Bethesda, Maryland) discussed the present-day biochemical approaches to schizophrenia, pointing out that these were restricted to the search for peripheral abnormalities in blood and urine, though in future—if detailed chemical examination of the brain were possible—relevant central abnormalities might be detected. At present two hypotheses were of interest. First, that an abnormal protein was present in the blood of schizophrenics, though the alleged antigenic and electrophoretic abnormalities were not consistently reproducible. Secondly, that abnormal transmethylation had an aetiological role. Dr. Kety cited three pieces of evidence supporting the latter theory. First, a number of psychotomimetic agents were methylated congeners of normal bodily constituents; secondly, the administration to schizophrenics of substances that could donate methyl groups—such as L-methionine—tended to accentuate the psychotic symptoms, while hydroxychloroquine (which inter-

fered with methylation) might have an ameliorating effect; and, thirdly, the reported occurrence in the urine of schizophrenics of 3,4-dimethoxyphenylethylamine, a dimethylated derivative of dopamine. Parenteral administration of the latter to man had produced no perceptible mental effects, but this, said Dr. Kety, did not preclude an effect from higher concentrations locally within the brain.

Dr. A. E. COPPEN (Epsom, Surrey) described three areas of current interest in the biochemistry of affective disorder—the monoamines, electrolytes, and the endocrine system. Depression could be due to a relative deficiency of monoamines such as 5-hydroxytryptamine. Agents, such as reserpine, which caused their depletion also caused depression; the administration of monoamine precursors, such as tryptophan, benefited depression; and depressed subjects showed markedly reduced urinary excretion of tryptamine. Dr. Coppen continued by saying that electrolyte abnormalities, reflecting an abnormal ion distribution within the body, were probably aetiologically related to affective disorder. Residual body sodium was increased by 50%

in depression and by 200% in mania. He suggested that the beneficial effect of lithium in mania and recurrent depression might be related to its depleting effect on the residual sodium. Investigation of endocrine function had thrown no light on the aetiology of affective disorder, and he thought that the increased adrenocortical output of cortisol in depression (but not in mania) was probably non-specific.

Psychosomatic Medicine

Professor W. LINFORD REES (St. Bartholomew's Hospital, London) defined psychosomatic disorders as conditions in which psychogenic and physiogenic factors were aetiologically important. In a series of 600 patients with bronchial asthma he had found that psychological, infective, and allergic factors were all prominent in most cases, and in only a small proportion was only one of these factors aetiologically important. Certain types of personality were found commonly in all psychosomatic illnesses, but there was no direct correlation. Adversity often precipitated the disease, but no particular