

## Inguinal Hernia in Infants and Children

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Inguinal hernia in infants and children is almost invariably of indirect and congenital type. It is congenital because the processus vaginalis of the peritoneum does not obliterate as it should be and becomes a hernial sac. It is obvious that a congenital inguinal hernia is always of indirect type because the hernial sac which represents patent processus vaginalis always runs along the inguinal canal.

On the basis of the pathogenesis of inguinal hernia in infants and children several special problems in diagnostic procedures and proper method of treatment are different from those in adults.

This paper presents statistical data of the inguinal hernia in infants and children at the Department of Surgery, Gadjah Mada University Hospital, and also some important aspects of its diagnosis and treatment.

### Statistical data

During the eleven-year period from Januari 1961 through December 1971, 179 infants and children to the age of twelve years with inguinal hernia were admitted to our hospital (TABLE 1). Of these 179 patients, 178 (99,4%) were males and only 1 (0,6%) was a female patient. 30,7% of the hernias occurred on the right side, 59,8% on the left, 8,3% were bilateral and of 1,2% there were no record.

Twenty (11,2%) of the 179 patients were with an incarcerated hernia. All of these were male patients, 30% were right-sided and 70% were left-sided hernias. Of these 179 patients, 160 (89,4%) patients, including all of the incarcerated hernias, underwent operation and there was not any operative death.

TABLE 2 shows the age distribution, 125 (70,8%) of the 177 hernias were in patients less than two years of age.

To compare this group of age distribution to several data found by other authors we present TABLE 3. It seemed that between our Hospital and Tjipto mangunkusumo Hospital in Jakarta reported by Pieter and Sjamsuhidajat (1969) had practically the same incidence. And we can see that about half of the infants and children with inguinal hernia admitted to the hospitals were those less than two years of age.

The side distribution of hernia is shown in TABLE 4. The incidence of the right-sided at our Hospital was about half of the left-sided hernias while on the contrary Gross (1953) reported that the right-sided was about twice the left-sided hernias. Moscarella (1962), Sjamsuhidajat (1966) and Pieter (1969) all reported that the incidence of the right-sided was higher than the left-sided hernia. And Tamboenan (1960) reported the incidence of the left-sided was a little higher than the right-sided hernia.

It has been mentioned before that the incidence of incarcerated hernia at our hospital was 11,2%. Other data as shown in TABLE 5 indicate that the incidence of incarcerated hernia in several hospitals had a wide ranges of percentages.

18 (90%) of the 20 incarcerated hernia were in patients less than two years of age (TABLE 6). 6 (30%) of the incarcerated were right-side and 14 (70%) were left-side.

The more common content of the hernial sac in our cases of incarcerated inguinal hernia were small intestines (TABLE 7), and the less common were terminal ileum, cecum and appendix.

## Discussion

The incidence of the right-sided hernia at Children's Hospital, Boston (Gross, 1953), St. Luke's Hospital, New York (Moscarella, 1962) and at Tjiptomangunkusumo Hospital, Jakarta (Sjamsuhidajat, 1966; Pieter, 1969) all were higher than the left one (TABLE 4).

Gross in 1953 explained this side distribution as follows. The right testicle descends at a later date than does the left. It has been estimated that the processus vaginalis on the left closes about 3 weeks before term, and that closure on the right follows about 1 week later (Kiesewetter, 1959). This delayed closure probably accounts for the greater frequency of congenital indirect inguinal hernia on the right side

Now, interest should be taken to the incidence of the side distribution at our Hospital which deviates from the data mentioned, the right-sided hernias (31,1%) were significantly fewer than the left one (60,5%).

It is too early to explain the reason responsible for this phenomenon before further surveys of more data are carried out, an anatomical research may be necessary.

## Some important aspects on diagnosis and treatment

Because of the close relationship between inguinal hernias and hydroceles on the basis of their pathogenesis, in every examination upon inguinal hernia in infants and children one should always be aware of the possibility that the hernia was associated with a hydrocele. Moscarella (1962) reported an incidence of 24% of this association.

Kiesewetter (1959) described that the subject of inguinal hernias and hydroceles might well be considered as a unit, since most hydroceles are simply manifestations of a basic hernia-hydrocele complex.

The examination for an inguinal hernia in infants and children especially the palpation should be quite different from that employed for adults. The structures of the inguinal canal in infants and children are so small that the method of palpation by invaginating the scrotum to insert a finger through the external ring is useless. An important information is seldom gained, in this way and moreover it will be disturbing to a child (Gross, 1953



TABLE 2. Age distribution on 177 infants and children with inguinal hernia at the Department of Surgery, Gadjah Mada University Hospital, Yogyakarta.

Age Group	Frequency	%
- 2	125	70,6
2 - 4	29	16,4
4 - 6	10	5,7
6 - 8	2	1,1
8 - 10	6	3,3
10 - 12	5	2,9
Total	177	100,0

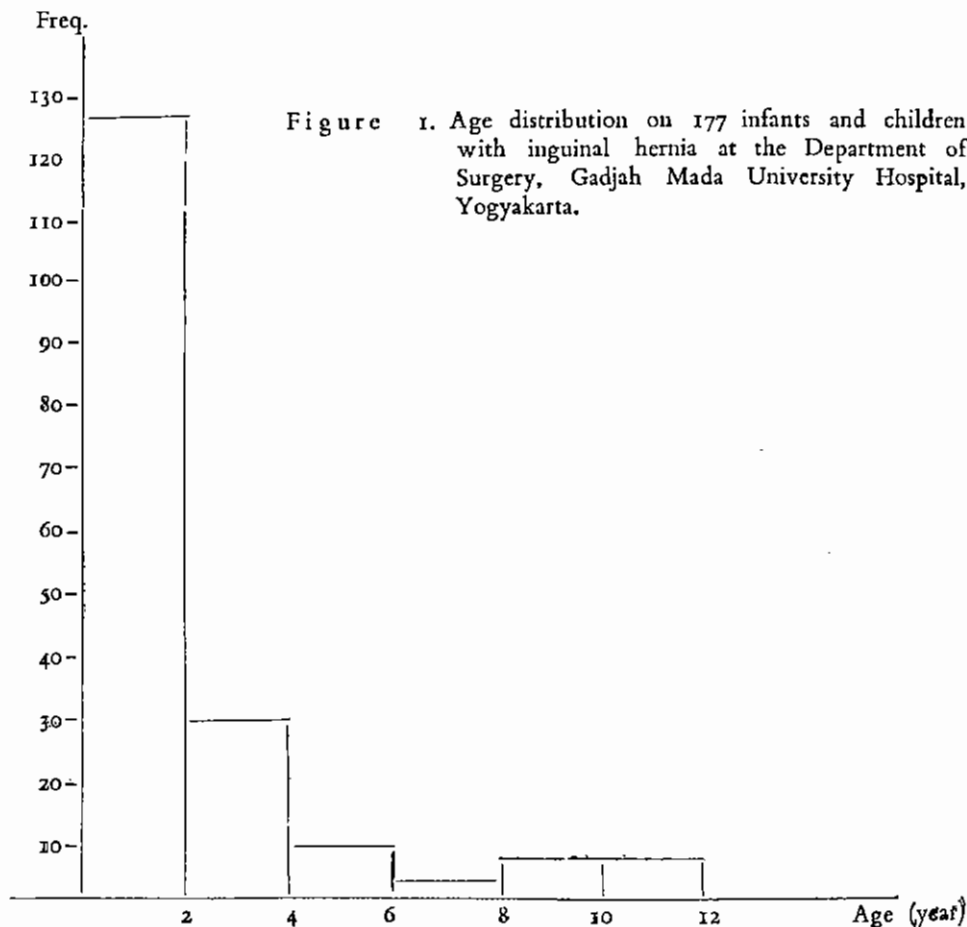


TABLE 3. Age distribution of group 0 to 2 years in comparison to some authors investigation.

Year	Author	Hospital	%
1960	Tamboenan	Tjiptomangunkusumo Hospital, Jakarta	50,9
1962	Moscarella and Stanley — Brown	St. Luke's Hospital, New York	49,9
	Swenson	Not mentioned	53,7
	Pieter and Sjamsuhidajat	Tjiptomangunkusumo Hospital, Jakarta	70,2
1972	Present author	Gadjah Mada University Hospital, Yogyakarta	70,6

TABLE 4. Side distribution of hernia in comparison to other authors investigation.

Year	Author	Hospital	Right	Left	Bilate ral	No. record
1953	Gross	Children Hospital, Boston	60 %	25 %	15 %	
1960	Tamboenan	Tjiptomangunkusumo Hospital, Jakarta	44 %	48 %	8 %	
1962	Moscarella and Stanley — Brown	St. Luke's Hospital, New York	54 %	35 %	11 %	
1966	Sjamsuhidajat	Tjiptomangunkusumo Hospital, Jakarta	51 %	44 %	5 %	
1969	Pieter and Sjamsuhidajat	Tjiptomangunkusumo Hospital, Jakarta	52,91%	38,34%	8,29%	0,46%
1972	Present author	Gadjah Mada University Hospital, Yogyakarta	31,1 %	60,5 %	8,4%	

TABLE 5. Incidence of incarcerated hernia in comparison to some authors investigation.

Author	Total No. Cases	Incarcerated	%
Pieter and Sjamshidajat	446	177	39,7
Heyder	258	57	22,1
Present author	179	20	11,2
Mascarella and Stanley - Brown	447	39	9
Thorndike and Ferguson	1740	106	6
Gross	3874	63	1,6
Swenson	506	64	12,6

TABLE 6. Age and side distribution on 20 infants children with incarcerated inguinal hernia at Department of Surgery, Gadjah Mada University Hospital.

Age Group	Frequency	%
0 - 2	18	90
2 - 4	2	10
4 - 6	0	0
6 - 8	0	0
8 - 10	0	0
10 - 12	0	0
Total	20	100

Right-sided	Left-sided
6	14
30%	70%

TABLE 7. Contents of hernial sac of 20 infants and children with incarcerated inguinal hernia at Department of Surgery, Gadjah Mada University Hospital, Yogyakarta.

Small Intestine	Terminal Ileum + Cecum (+ Appendix)	Spontaneous Reduction During Operation	No Record
9	4	2	5

Swenson, 1962). A more valuable method of determining the presence of hernial sac in infants and children is to place the index or middle finger parallel to and over the inguinal canal and then lightly rubbing from side to side across the cord. If a hernial sac is present a rustling sensation as if rubbing two layers of silk is felt. It has been referred to as the "silk sign" (Kiesewetter, 1959).

In every case of inguinal hernia in infants and children it is mandatory to examine properly the other side. If bilateral hernias are present it can be operated both at one sitting.

It is now generally accepted that a pediatric hernia should be corrected as soon as the diagnosis has been established since spontaneous closure of a hernia is distinctly uncommon (Gross, 1953).

The majority of hernias at our hospital were operated using the technique advocated by Potts, consisting of high ligation of the hernial sac, minimal manipulation of the cord, and simple closure of the external oblique fascia without reconstruction of the inguinal canal. At transverse "skin crease" incision and subcuticular skin closure was the rule with aeroplast used as a coating dressing.

### Summary

179 cases of inguinal hernia in infants and children, including 20 incarcerated cases during the eleven-year period from January 1961 through December 1971 at the Department of Surgery, Gadjah Mada University Hospital, were reported.

In accordance to most of the references attention was given to the incidence of the left side in the report (59,8%) which paradoxically was markedly higher than the right side (30,7%).

Operations were performed on 160 cases and the mortality rate was 0 percent.

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