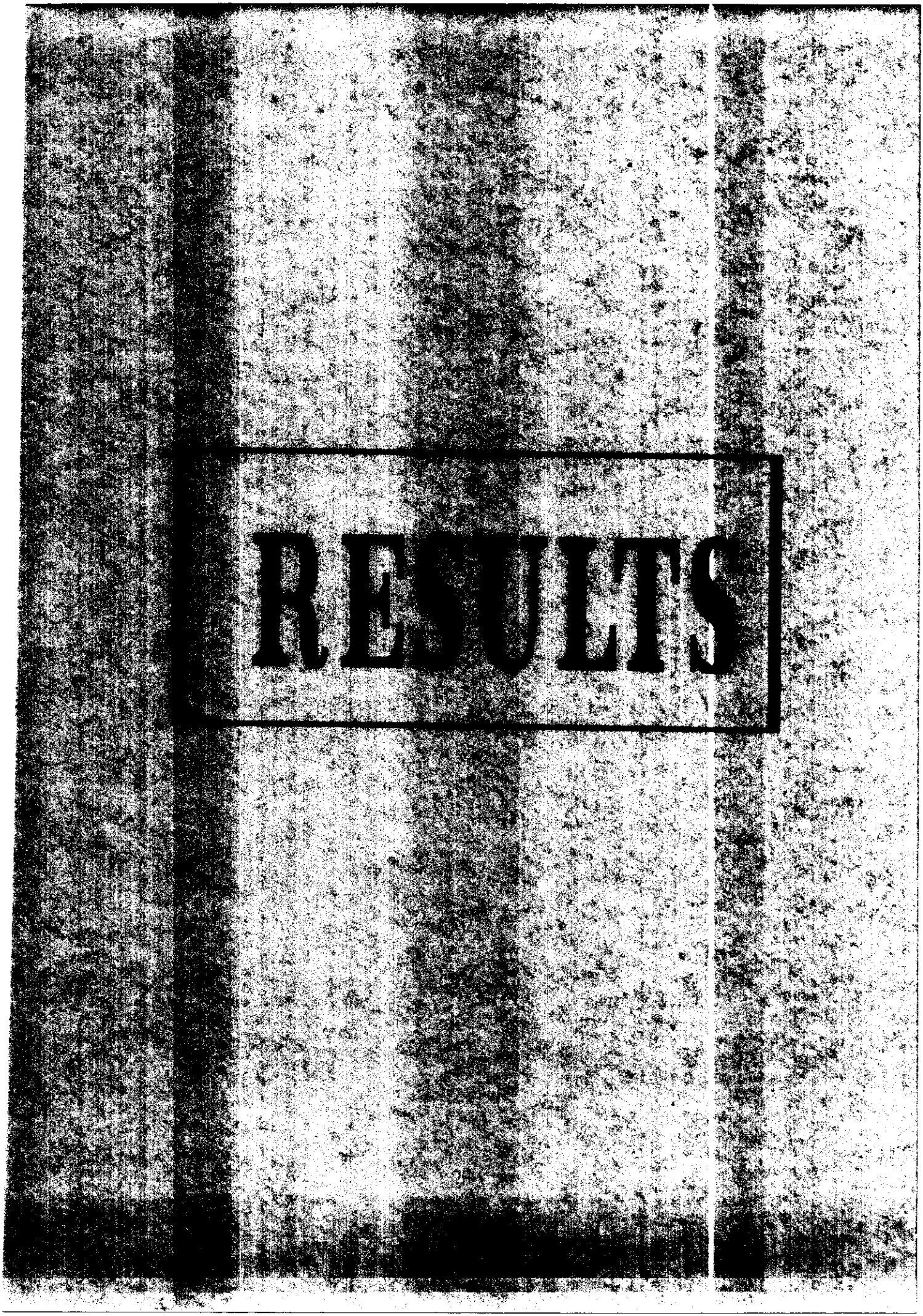
RESULTS

RESULTS

Follow up

The patients were followed up after treatment, for a mean period of 17.5 months with a range of 8 months to 27 months. The ages at the latest follow up ranged from 8 months to 3 years and 3 months. There were no cases in this series with presistance of infection. The time for resolution of infection, assessed by E.S.R. ranged from 1 week to 4 weeks with a mean of 2.5 weeks.

Descriptive Findings

The predisposing factors (Table 9), were present in 27 patients (90%). The most common predisposing factors were prematurity and jaundice.

Table (9). Predisposing factors.

Diagnosis	No. of cases	%
Preterm	10	33.3
Jauadice	7	23.3
Pneumonia	3	10.0
Skin or umblicial sepsis	5	16.8
Meningitis	1	3.3
Dehydration	1	3.3
None	3	10.0
Total	30	100.0

A history of incubator admission (Table 10), was proved in 92.3% for variable reasons. All the cases, while incubated, have been subjected to frequent venipuncture for diagnostic or theraputic purposes as antibiotic injection or exchange transfusion. As regard the possibility of femoral vein puncture as a cause can not be confirmed.

Table (10). Number of cases with incubator admission.

Item	No.	% of total neonates	%of total cases
Incubator admission	24	92.3	80.0

The knee and shoulder joints (Table 11), were the only joints other than the hip joint faced as associated septic arthritis.

Table (11). Cases with multiple site epiphysitis.

Item	No.	% of total cases
Hip + Shoulder	2	6.7
Hip + Knee	1	3.3

Out of 30 cases with septic arthritis (Table 12), the time elapsed since the appearance of syptoms could not be detected in four cases (13.3%). The earliest diagnosis was at two days and the most delayed diagnosis was at 30 days with a mean of (16 days). Cases discovered within a week

was 15 cases (50%) and those discovered more than a week was 11 cases (36.7%).

Table (12). Time of delay of managment.

Time of delay	No. of cases	%
<4	8	26.7
4 - 7	7	23.3
>7	11	36.7
Unknown	4	13.3
Total	30	100.0

The most common signs detected in such cases were pain on napking or passive movement and lack of active movement of the affected extremity which was held immobile in flexion (pseudoparalysis). Swelling of the hip or gluteal region were less common (Table 13). In any case with septic arthritis hip joint, there must be at least any of the above listed signs.

Table (13). Local abnormal signs detected at the hip joint.

Local sign	No. of cases	%
Pain on passive movement	27	90.0
Pseudoparalysis	27	90.0
Local swelling	14	46.7
At least, any sign of the above	30	100.0

The constant feature in most of early radiographs (Table 14), is an increase in the distance between the acetabulum and the visualized portion of the upper end of the femur denoting subluxation or dislocation (83.3%). The next common radiologic sign is inlargment of the soft tissues arround the hip and obliteration of the lucent planes (36.7%). The initial radiograph was negative in 6.7% of cases.

Table (14). Initial radiographic evaluation.

Item	No. of cases	% of total
Sublux./Disloc.	25	83.3
Periosteal elevation	5	16.7
Metaphyseal rarefaction	5	16.7
Metaphyseal destruction	2	6.6
Soft tissue signs	11	36.7
At least, any sign of the above	28	93.3

Ultrasound (Table 15), was done in 19 cases (63.3%). Out of these, there were positive findings in 14 cases and no abnormality was detected in 5 cases. The positive cases showed effusion in 12 cases with head destruction in one of them. The other two cases showed dislocation and destruction of the head of the femur.

Table (15). Ultrasound of the hip joint.

Item	No.	% of total
+ve	14	46.7
-ve	5	16.6
Not done	11	36.7
Total	30	100.0

Blood culture, as a diagnostic aid for the offending organism, had not been done in 12 cases due to inability to collect enough sample for culture (Table 16). The number of cases underwent this investigation was 18 (60.0%) with positive culture in 10 cases (33.3%). These 10 cases proved to have streptococcus bactermia in 6 cases and staphylococcus bactermia in 4 cases.

Table (16). Blood culture.

Blood culture	No. of cases	%
Staph.	4	13.3
Strept.	6	20.0
Gram -ve	-	-
-ve culture	8	26.7
Not done	12	40.0
Total	30	100.0

Aspiration of the hip joint was attempted in all cases (Table 17). Only 23 cases yeilded turbid fluid (76.7%).

Table (17). Aspiration.

Item	No. of cases	%
Positive	23	76.7
Negative	7	23.3
Total	30	100.0

Out of 23 cases with available aspiration of the hip joint content (Table 18), no organism was detected in 7 cases.The remaining 16 cases was infected by staphylococci in 7 cases, streptococci in 4 cases and gram -ve bacilli in 5 cases.

Table (18). Organism after culture of the aspirate.

Item	No. of cases	%
Staphylococci	7	30.4
Streptococci	4	17.5
Gram -v bacilli	5	21.7
No organism	7	30.4
Total	23	100.0

A bacteriologic proof of infection, either from the joint or blood or both, was available in 20 cases (Table 19 & Fig.32). Staphylococcus infection was the most prominent of all (30%), streptococci in 20% of cases. grame -ve bacilli infection in 13.3% of cases and mixed

infection with staphylococcus, gram -ve bacilli in one case (3.3%).

Table (19). Cases with positive organism either in the blood or aspiration fluid.

Item	No. of cases	%
Staph.	9	30.0
Strept.	6	20.0
Gram -ve	4	13.3
Mixed infection	1	3.3
No organism	10	33.4
Total	30	100.0

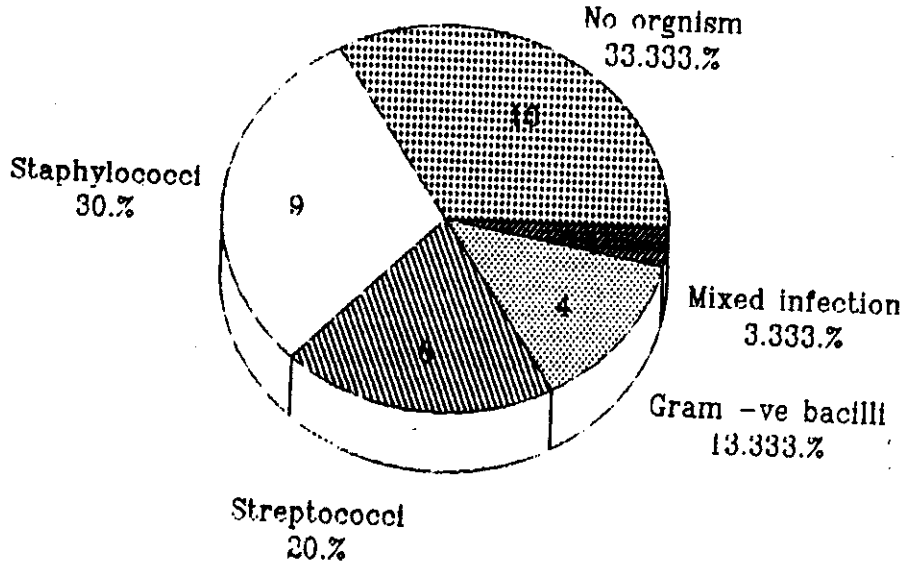

Fig. (32). Cases with positive organisms either in the blood or aspiration fluid.

During subsequent follow up by X-ray, 21 cases were free from associated osteomylitis of the proximal femur (Table 20). Meanwhile, 9 cases had a radiologic stigma of osteomylitis.

Table (20). Number of cases proved to have metaphyseal osteomylitis on follow up radiograms

Item	No. of cases	%
Periosteal elevation	2	6.7
Metaphys-epiph. destruc.	2	6.7
Both of the above	5	16.6
None	21	70.0
Total	30	100.0

As shown in Fig. (33), 23 hips proved to have pus on aspiration (76.6%) were drained through either anterior or posterior approachs. As regard the antibiotic treatment there were 16 cases (53.3%) fitting protocol (I) of antibiotic and 14 cases (46.7%) fitting protocol (II) of antibiotic (Fig. 34).

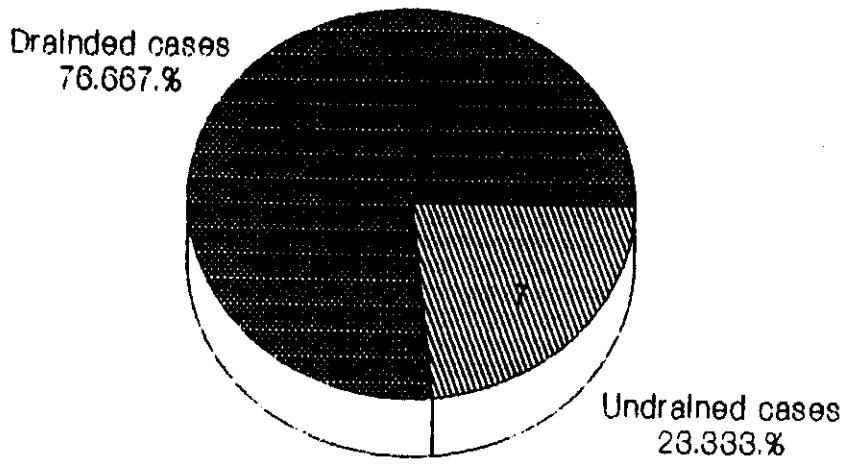

Fig. (33). Distribution of drainge

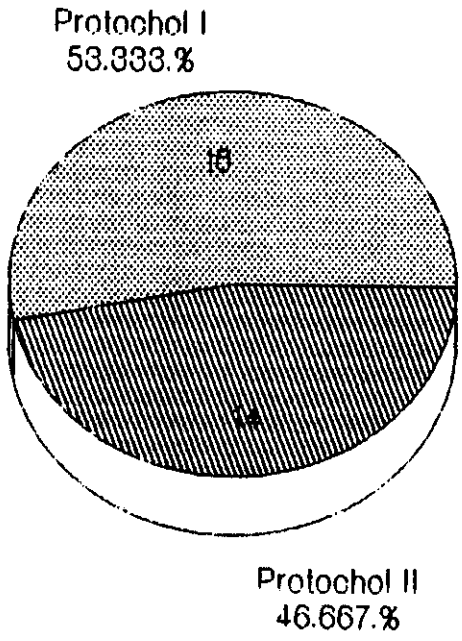

Fig. (34). Antibiotic treatment.

Assement of the results

I. The system of assessment

In the follow up visits, each patient in this study was subjected to both clinical examination and radiologic examination.

A. Clinical Examination

The clinical examination was performed as following:

1. Gait pattern.
2. Range of movement.
   - Normal.
   - Good (with limitation <50%).
   - Poor (with limitation >50% or ankylosis).
3. The degree of shortening.
4. Deformity (flexion, adduction, abduction, ...).

Badgley et al. (1936) considered the clinical results are satisfactory when there is:

1. Freedom from drainge.
2. Freedom from pain.
3. Satisfactory gait (normal or good).
4. Satisfactory range of movement (normal or limitation <50%).

We were not able to rely upon some of these parameters specially the gait pattern and the pain complaint becauase many of the cases were too young to obtain a sastisfactory judgement on either. All cases have

Assesment of the cases clinically and radiologically was made and, on using this system as a giude, we considered the results are satisfactory when:

1. There is no significant shortening (2 cm).
2. There is no marked limitation of movement (<50%).
3. There is no complication requiring secondary surgical intervention.

II. Results of Treatment

1.The range of movement

The range of movement (Table 22), was completely normal in 10 cases(33.3%). There were a good range of movement in 18 cases(60%). The limitation of movement was mainley in abduction with or without limitation of internal rotation. There were two cases with marked limitation of movement of the affected hip (Fig. 35).

Table (22). Range of movement.

Item	No. of cases	%
Normal	10	33.3
Good (limit.<50%)	18	60.0
Poor (Limit.>50%)	2	6.7
Total	30	100.0

2. Shortening

There were only three cases with significant shorteining and no shortening at all in 13 cases (Table

23). The remaining 14 cases had a variable degree of shortening ranging from 0.5 to 1.5 cm (Fig.36).

Table (23). Shortening

Item	No. of cases	%
No shorteining	13	43.4
<2 cm	14	46.6
≥2 cm	3	10.0
Total	30	100.0

3. The radiologic appearance

Examination of the last follow up X-rays showed the following findings:

Group I of cases, according to the radiological classification, included 11 hip joints (Table 24). These cases had no subluxation with normal epiphysis or slightly irregular (non spherical epiphysis). The results of this group are rated by **Knudsen and Hoffmen (1990)** as excellent results.

Group II of cases, included 7 hip joints with mild subluxation, with/without partial destruction of the epiphysis or incomplete appearance of the epiphysis or irregular epiphysis (Table 24). Also, this group includes cases with deformed head and coxa vara. The results of group I and II are rated by **Knudsen and Hoffmen (1990)** as satisfactory results.

Group III of cases, included 10 hip joints with franke dislocation and/or destruction of the epiphysis or destruction of the proximal femur (Table 24). The cases

of this group are considerd radiologically as non satisfactory.

Table (24). Radiologic grading

Grade	No. of cases	%
I	11	39.3
II	7	25.0
III	10	35.7
Total	28	100.0

There were two cases, with delayed appearance of the epiphysis not included as the condition of the epiphysis cann't be determined and in need for further follow up. These two cases had satisfactory clinical out come.

Out of 30 cases with septic hip arthritis (Table 25), the follow up radiologic appearance of the hip joint was satisfactory in 18 cases (60.0%) and unsatisfactory in 10 cases (33.3%) and needing further follow up and assessment in 2 cases (6.7%).

Table (25) . The radiologic result, final score.

Result	No. of cases	% of total
Satisfactory	18	60.0
Non satisfactory	10	33.3
Cases needing further assessment	2	6.7
Total	30	100.0

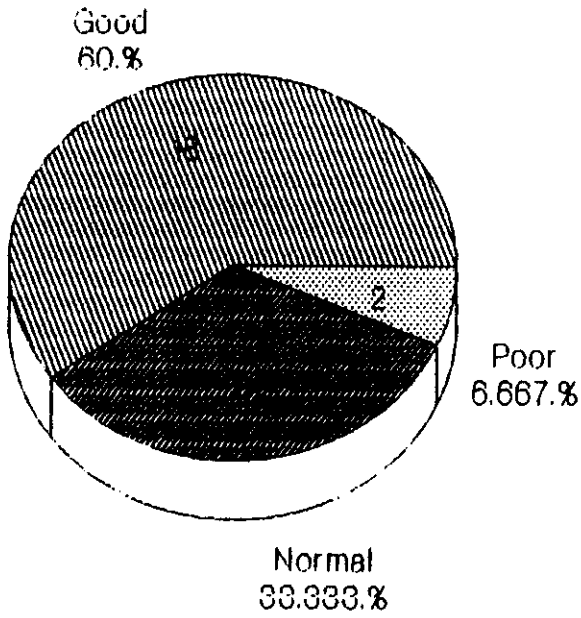

Fig. (35). Range of movement.

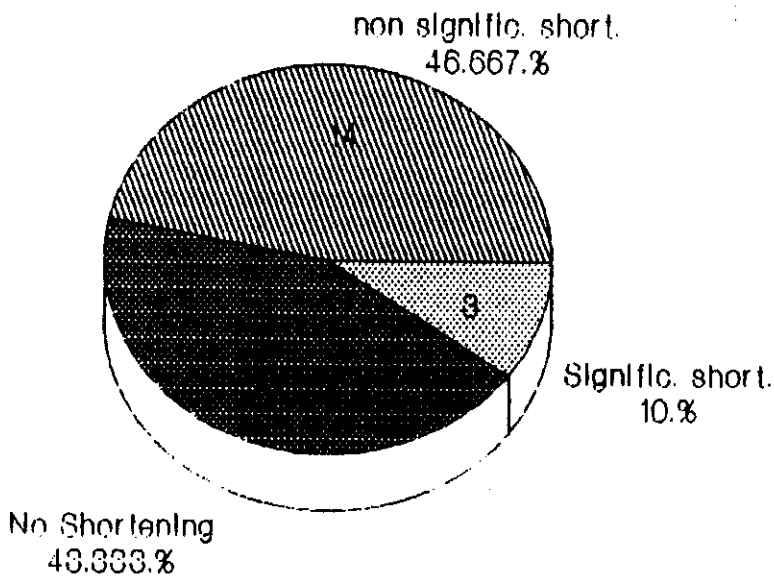

Fig. (36). Shortening.

4- Sequele needing secondry surgical intervention

At the end of follow up, it was evident that some cases are suffering complications necessitating second surgical procedures (Table 26 & Fig.37).

Table (26). Distribution of cases needing secondary surgical management.

Sequel requiring 2nd surgical treat.	No.	%
Pathological dislocation	4	30.7
Destruction of the proximal femur*	6	46.2
Coxa vara	3	23.1
Total	13	100.0

* In this group of six patients there were two cases with severe limitation of movement.

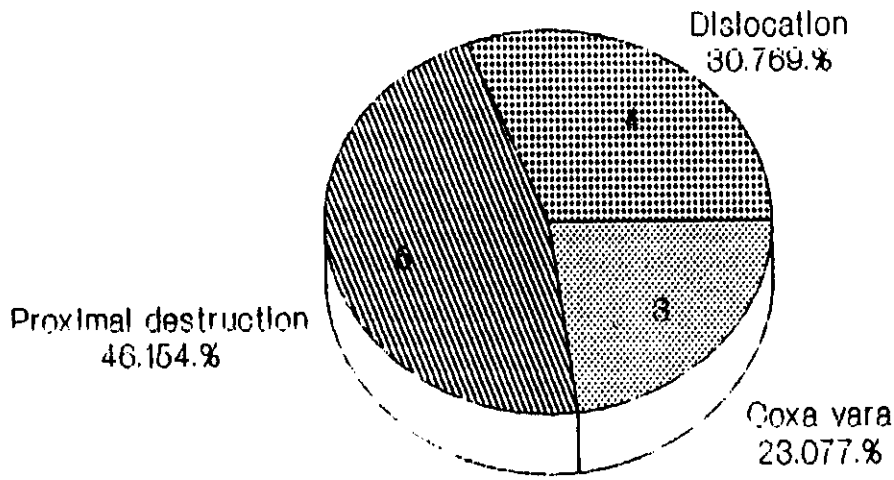

Fig. (37). Distribution of cases needing secondary surgical treatment.

5- Final score of the results

Using the criteria of Morrey et al., (1976) as a guide, the results were considered satisfactory in the presense of a good range of movement, insignificant or no shortening, absence of complications. As a final outcome (Table 27), the results of management of cases with septic hip arthritis included in this work, were considered satisfactory in 17 cases and unsatisfactory in 13 cases (Fig.38).

Table (27). Final score of the results.

Result	No. of cases	%
Satisfactory	17	56.7
Non satisfactory	13	43.3
Total	30	100.0

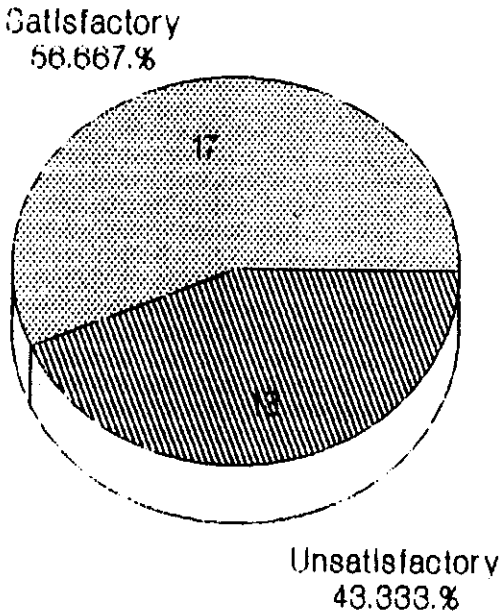

Fig. (38). Final score of the results.

As regared the non satisfactory results (Table 28), there were eleven cases with complications needing secondary surgical procedures such as open reduction, abduction osteotomy or trochantroplasty. these cases were considered having non satisfactory results. Also, the results were considered unsatisfactory due to sever limitation of movement in another two additional cases.

Table (28). Distribution of cases with non satisfactory results.

Results	with shortening	without shortening	Total number
Cases needing 2nd. surgery	2	9	11
Marked limit. of movement	1	1	2
Total number	3	10	13

Complications or Sequele

1. Pathologic dislocation of the hip joint

Dislocation of the joint is a frequent complication of septic hip epiphysitis. This occured in 4 cases (13.3%). The epiphysis was irregular in 3 cases and delayed in appearance in one case. All this cases failed to reduce in abduction splint for a variable period of time and were in need for open reduction.

2. Destruction of the femoral head or the proximal epiphysis with or without dislocation

This complication occured in 6 cases (20.0%). Disappearance of the femoral head occurs due to sequestration by pyoarthrosis or avascular necrosis from pathologic dislocation. Dislocation was associated in two cases and varus neck stumb was found in one case.

3. Coxa vara

This complication was found during the follow up in 3 cases, one case was associated with partial head destruction and in the other two cases there was associated deformity of the head. This complication arises from partial epiphysial affection with disturbed growth of the proximal femoral epiphysis and alteration of inclination angle.

4. Marked limitation of movement.

This was found in two cases (6.7%). The two cases were associated with destruction of the proximal femur and shortening of two centimeters. These two cases were

cosidered of poor outcome and the value of further surgical managment was questioned.

5. <u>Significant shortening (2 cm or more)</u>

This complication was found in 3 cases. In such cases, there were dislocation and total destruction of the proximal femur.

Correlative Analysis of the Results

We investigated the relation of the results to some of the prognostic factors.

There is a highly significant relation between the results and the period of delay befor diagnosis and management being commenced (Table 29). The correlation coeffecient indicates that the more the delay the worse the outcome.

Table (29). Correlation between delay of treatment and results.

Treatment delay	Satisfactory cases	non satisfactory cases
≤4	8	0
>4 - 7	5	2
>7	2	9

Chi-Square value= 148, P-value= 0.0001,
Significance: Highly Significant
Correlation coefficient (r)= 0.703.

Also, the relation between the offending organism and the outcome is highly significant, with poor outcome in cases infected by staphylococcys organism (Table 30).

Table (30). Correlation between the type of organism and result.

Organism	Satisfactory cases	Non satisfactory cases
Staphylococci	3	6
Non Staph.	9	2

Chi-square value= 48.1, P-value= 0.0001,
Significance: Highly Significant.
Correlation coefficient (r)= - 0.491.

Whenever there is associating osteomylitis, the results anticepated is usually poor. Out of 9 cases with osteomylitis 8 had unsatisfactory results (Table 31) .

Table (31). Correlation between occurrence of osteomylitis and results.

Osteomylitis	Satisfactory cases	Non satisfactory cases
Absent	16	5
Present	1	8
Total	17	13

Chi-Square value= 10.9, P-value= 0.001,
Significance: Highly Significant,
Correlation Coefficient (r)= 0.602.

Tables (32) and (33) indicates that what is important is how early the drainge was done. In another way , the drainge of hip joint sepsis plays a useful role, only, if done early and late drainge is of no significance.

Table (32). Correlation between the results and surgical drainge.

Item	Satisfactory cases	Non satisfactory cases
Drainge	14	9
Non drainge	3	4
Total	17	13

Chi-Square value= 0.71, P-value= 0.40,
Significance: Not Significant,
Correlation Coefficient= 0.154.

Table (33). Correlation between the results and time of drainge.

Drainge	Satisfactory cases	Non satisfactory cases
Within a week	10	2
More than a week	3	5
Total	13	7

Chi-Square value= 4.4, P-value= 0.03,
Significance: Significant,
Correlation Coefficient(r)= 0.471.