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Hydatid Disease Incidence and Laboratory Diagnosis in Sana'a 2020-2023

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Abstract:

Background: hydatid disease is common zoonosis disease in third world countries specially Yemen caused by parasite echinococcosis granulose it's diagnosed on clinical, laboratory (serology) and radiological bases. it's effect liver, lung, pelvis and many other organs – the point of incidence and diagnosis become important for treatment and improve outcome.

Objective: Assess the incidence rate, laboratory and radiological diagnosis and outcome of hydatid disease in last years in Sanaa-Yemen.

Patient and methods: this are a retrospective descriptive case series study among Yemen patients presented and operated in same governmental and private hospitals in Sanaa city – Yemen during period April 2020 to April 2023 which study conducted on 92 cases after confirming presence and operated for hydatid disease. This short-term study was established after ethical consideration, in which the data collected to performed questioner after recording data from patient file and interviewing patient and his responsible resident surgeons and consultants since receiving the case till the patient was operated and after discharged, after that collected data have been computerized to be analyzed through SPSS and excel programs.

Results and discussion: Our study show that females are more affected (54%). than male (46%) and that the middle age group (15-64) years are the most, with a rate of (85%). married social state take the most of sample (64%), and also most of them with average socioeconomic state (58%). Most cases of our study were live in Amanat Alasimah (20%) And furthermore most patient was born in al Mehwit (20%)., the most common organ affected by hydatid cyst is Liver (43%) then lung. The most common Risk Factors or method for transmation is Direct contact with infected dog or cat/another animal (34%). almost sample give no medical, surgical or family history.

All patient (100%) diagnosed radiologically and only 37% has confirmed on laboratory bases as ELIZA OR IHAT and ELIZA most common and most common radiological method is sonography, X RAY AND CT SCAN (54%). MOST patient was operated the time of study (86%) other patient was under preparation or on waiting list or continue under medical treatment, and also the majority of patient operated in private with a rate of (63%), and governmental (37%) & (78%) was take medical therapy before and after operation successively, the Complicated cases before the operation only 21%, and only 5% and 11% complicated either during or post operation successively .significant rate 9% has recurrent disease, the majority of them treated medically with a rate of (63%).,

Conclusion: hydatid disease is common disease affect female than male and high rate in Amanat Alasema Sana'a and al Mehwit in average married population. Commonly transmitted by direct contact with dogs and other animal and totally depend on radiological diagnosis and only near third surgeon depend on laboratory diagnosis specially ELIZA and near half has been taken medical therapy pre or post operation

//significant rate 9% has recurrent disease in patients not used neither laboratory diagnosis nor take medical therapy post operation.

Keywords: recurrent disease, patients, laboratory diagnosis, medical therapy, post operation.

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CHAPTER (1) : **Introduction and literatures review**

HISTORICAL BACKGROUND: *Hydatid disease*

Human Echinococcosis: is a parasitic disease caused by tapeworms of the genus Echinococcosis.

The two most important forms in humans are cystic echinococcosis (hydatidosis) and alveolar echinococcosis.

- *Common Name: dog tapeworm*
- *Disease: cystic hydatid disease (hydatid cyst disease) or cystic echinococcosis or cystic hydatidosis.*
- *Definitive hosts: dogs and other canines.*
- *Intermediate hosts: humans (dead-end hosts) and herbivorous animals (Particularity sheep)*
- *Habitat:*
  - ❖ *Adult worm small intestine of dogs and other canines.*
  - ❖ *Larval stage (hydatid cysts) tissues of humans and herbivorous animals.*

Hydatid cyst:

Unilocular hydatid cyst (composed of a single cavity).

- *Shape: spherical and surrounded by a cyst wall*
- *Size: usually 1-10 cm (but may reach >20 cm).*
- *Structure of hydatid cyst:*

a) ***Cyst wall****: consists of 3 layers*

1- Pericyst: a fibrous capsule produced by host tissue reaction.

2-Ectocyst: a thick (about 1 mm), laminated, non-cellular layer

3-Endocyst: a thin (one-cell layer), germinal epithelial layer that produces protocolizes and brood capsules.

b) ***Cyst contents:***

1- Brood capsules: a collection of protoscolices.

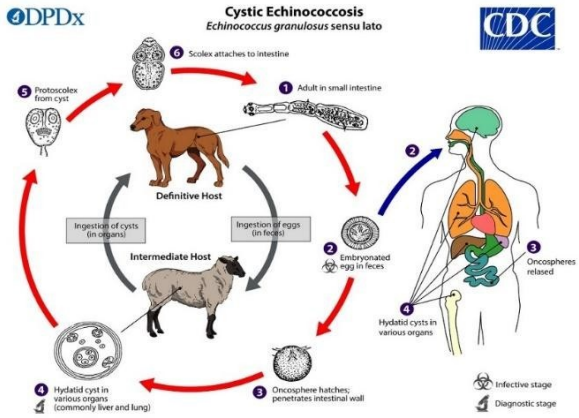
2- Hydatid fluid: a colorless fluid inside the cyst; highly antigenic.

3- Hydatid sand: free brood capsules and protoscolices in the hydatid fluid.

4- Daughter cysts: Free cysts in the hydatid fluid or attached to the germinal layer or arising outside the cyst wall.

Transmission:

- ❖ *A number of herbivorous and omnivorous animals act as intermediate hosts of Echinococcus. They become infected by ingesting the parasite eggs in contaminated food and water, and the parasite then develops into larval stages in the viscera.*
- ❖ *Carnivores act as definitive hosts for the parasite, and harbor the mature tapeworm in their intestine. The definitive hosts are infected through the consumption of viscera of intermediate hosts that contain the parasite larvae.*
- ❖ *Humans act as so-called accidental intermediate hosts in the sense that they acquire infection in the same way as other intermediate hosts, but are not involved in transmitting the infection to the definitive host.*
- ❖ *Drinking contaminated water.*
- ❖ *Eating infected soil found on vegetables, green or berries.*
- ❖ *Petting or handling an infected dog.*



1 *The adult* Echinococcus granulosus *(sensu lato) (2—7 mm long) resides in the small intestine of the definitive host, Gravid proglottids release eggs that are passed in the feces, and are immediately infectious.*

Life Cycle:

- ❖ *After ingestion by a suitable intermediate host, eggs hatch in the small intestine and release six-hooked oncospheres that penetrate the intestinal wall and migrate through the circulatory system into various organs, especially the liver and lungs.*
- ❖ *In these organs, the oncosphere develops into a thick-walled hydatid cyst that enlarges gradually, producing protoscolices and daughter cysts that fill the cyst interior.*
- ❖ *The definitive host becomes infected by ingesting the cyst-containing organs of the infected intermediate host.*
- ❖ *After ingestion, the protoscolices. evaginate, attach to the intestinal mucosa, and develop into adult stages, in 32 to 80 days.*
- ❖ *Humans are aberrant intermediate hosts, and become infected by ingesting eggs*
- ❖ *Oncospheres are released in the intestine hydatid cysts develop in a variety of organs.*
- ❖ *If cysts rupture, the liberated protoscolices may create secondary cysts in other sites within the body (secondary echinococcosis)*

S i g n s a n d s y m p t o m s

Human infection with E. granules leads to the development of one or more hydatid cysts located most often in the liver and lungs, and less frequently in the bones, kidneys, spleen, muscles, central nervous system, eye and uterus.

The asymptomatic incubation period of the disease can last many years until hydatid cysts grow to an extent that triggers clinical signs, however approximately half of all patients that receive medical treatment for infection do so within a few years of their initial infection with the parasite.

Clinical manifestation depends on the site, number and size of cysts.

1-In liver: Hepatomegaly, tenderness and obstructive jaundice.In lung: Cough, hemoptysis, dyspnea and chest pain,In kidney: hematuria, albuminuria and renal colic,In brain: seizures and increase intercranial pressure,In Eye :cyst like lesion In Spleen: cystic structure lesion,In Uterus :abdominal swelling

Diagnosis:

1/ Clinical Symptoms of the patient 2/Imaging and Immuno diagnosis

- ***Radiological Examination*** *(X-ray, ultrasonography and CT scan): cyst*
- ***Immunological tests:*** *A-**Casoni test**: intradermal (injection of 0.1ml of sterilized hadatid fluid on the fore arm and an equal volume of saline on the other forearm.B-**Serological Tests** :To detect anti-Echinococcus antibodies.Such as ELISA, IHAT, IFAT and CFT.*

Treatment: *Both cystic echinococcosis and alveolar echinococcosis are often expensive and complicated to treat, sometimes requiring extensive surgery and/or prolonged drug therapy*. There are 3 options for the treatment of cystic echinococcosis:1-Percutaneous treatment of the hydatid cysts with the PAIR (Puncture, Aspiration, Injection, Re-aspiration) technique 2-Surgery 3-Anti-infective drug treatment*

Prevention and control

1) *Personal hygiene: washing hands after handling or contact with dogs and avoiding contact with soil contaminated with dog excreta.*
2) *Proper washing of vegetables and fruits.*
3) *Periodic treatment of pet dogs: with praziquantel at six-weekly intervals.*
4) *Control of stray dogs*
5) *Preventing dogs from having access to raw animal meat or viscera.*
6) *Proper disposal of animal carcasses.*

Drug therapy: *[Albendazole] Administer in a dose of 10-15 mg/kg /day or 400mg twice dailly.*

•Treatment given in cycles of 28 days.(with two weeks treatment freeperiods between cycles)•.Inoperable cases- as primary treatment -3 cycles.

•Pre-operatively - to reduc the risk of recurrence 6 weeks continuous treatment.

•Post-operatively - to prevent recurrence in cases of intra-operative cyst spillage - 3 cycles

CHAPTER (2): Objectives of the study

Main objective: *Assess the incidence rate, laboratory and radiological diagnosis and outcome of hydatid disease*

Specific objectives:

1. *Study demographic distribution of hydatid disease*
2. *Assess the AGE AND SEX affected by hydatid disease.*
3. *Study the organ affected of hydatid disease.*
4. *Evaluate the rate for laboratory and radiological diagnosis.*
5. *Evaluation the methods of medical or surgical management.*
6. *Assessment of the risk factors for hydatid disease*
7. *Determine the morbidity and mortality for hydatid disease.*

CHAPTER (3) : *Methodology*

Study design: *retrospective descriptive case series study.*

Sample population: *all patients who are presented to private and governmental hospitals and admitted to surgical department with hydatid disease and treated medically or surgically and post operative patient.*

Study sample: *All patients who are presented to private and governmental hospitals and admitted to surgical department with hydatid disease and treated medically or surgically and post operative patient or cases presented to private clinics for surgeon or even cases coming for follow up and also from files in hospitals archive.*

Inclusion and exclusion criteria.

INCLUSION CRITERIA	***EXCUSION CRITERIA***
1. patient presented with clear diagnosis of hydatid disease diagnosed pre operatively. ***2. patient with abdominal surgery who accidently discovering*** ***3. Patient presented late after appearance of complication.*** ***4. Patient treated or operated in the past during (Feb 2020-Feb 2023)***	***1 – patient with any unreliability or defect in his diagnosis.*** ***2 - patient who's referred to another hospital or DAMA.*** ***3 - far patient. or uncooperative patient.***

Sample size*:92 consecutive patients who are presented or treated in Amant Alasemah either in governmental or private*

Study site and duration: Amanat Alasemah Sana'a Yemen, Privat or governmental medical centres (hospitals – lab)) through the duration since Jun 2020 till may 2023.

Instruments, materials: *pens, camera, English typed questioner for data collection through direct interview with patient, responsible surgeon and from patient's file.*

Ethical consideration: *English typed questioners performed by researcher was filled from direct interview with patient , responsible surgeon and from patient's files with strict considerations regarding insuring privacy of data as right for patient and responsible surgeon , after taking permission from training center and responsible supervisor according to global criteria of medical ethics and research role ,to fulfil the requirement of becloria degree program to get beclore certificate in laboratory*

Key word: *hydatid disease, affected organ, lab diagnosis, radiological diagnosis, risk factors.*

CHAPTER (4) : ***Results***

1/Distribution of the study sample by sex: *Table (1)*

Sex	***Frequency***	***The percentage %***
M	*42*	*46%*
F	*50*	*54%*
Total	*92*	*100%*

Source: Prepared by researchers based on the outputs of the SPSS statistical software package, 2023

It is clear from Table (1) and) that females are the most, and they ranked first, with a rate of (54%).

2/ Distribution of the study sample by age ; Table (2).

Age	Frequency	The percentage %
(1-14)	9	10%
(15-64)	78	85%
(65-more)	5	5%
Total	92	100

Source: Prepared by researchers based on the outputs of the SPSS statistical software package, 2023.

It is clear from Table (2) that the middle age group (15-64) years are the most, and they ranked first, with a rate of (85%).

3/ Distribution of the study sample by Social State:Table (3).

Social State	Frequency	The percentage %
Single	31	34%
Married	59	64%
Widow	2	2%
Total	92	100%

It appears from Table (3) that the study sample, according to the Married category, are the most, and they ranked first with a rate of (64%).

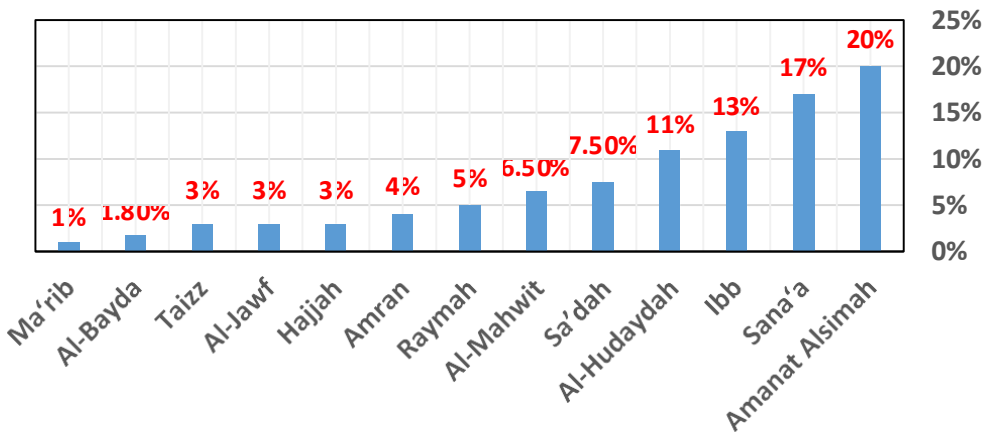
4/ Distribution of the study sample according to the Socioeconomic State:Table (4).

Socioeconomic	Frequency	The percentage %
Weak	33	36%
Average	53	58%
High	6	6%
Total	92	100%

Source: Prepared by researchers based on the outputs of the SPSS statistical software package, 2023.

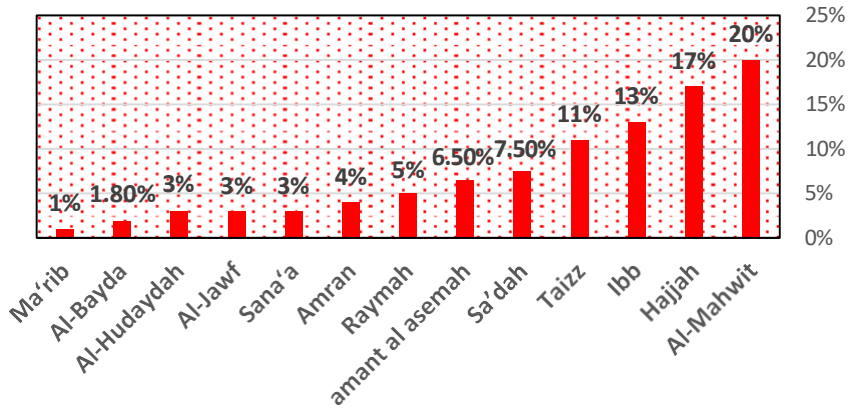
It is clear from Table (4) that Average are the most and they ranked first, with a rate of (58%).

5/ Distribution of the study sample according to Recent address:Figure (1)



It is clear from Figure (1) that the category of residents, Amanat Alasima, is the most, and they ranked first, with a rate of (20%).

Figure (2) Distribution of the study sample by site of birth.



Source: Prepared by researchers based on the outputs of the SPSS statistical software package, 2023.

It is clear from Figure (2) that the almehwit category is the most, and they ranked first, with a rate of (20%).

6/ Distribution of the study sample according to organ affected by hydatid cyst:

Table (5) Distribution of the study sample according to organ affected by hydatid cyst.

Organ Affected	Frequency	The percentage %
Liver	40	43%
Lung	30	32%
combined liver &lung	12	13%
GIT	2	1.80%
Bone	1	1%
Uterus	1	1%
Spleen	1	1%
Ovary	1	1%
Brain	1	1%
Abdominal wall	1	1%
Pelvic Organs	1	1%
Mesentery	1	1%
Total	92	100%

Source: Prepared by researchers based on the outputs of the SPSS statistical software package, 2023.

It is clear from Table (5)), according to Organ affected by hydatid cyst, that most of them are from the Liver category, and they ranked first, with a rate of (43%).

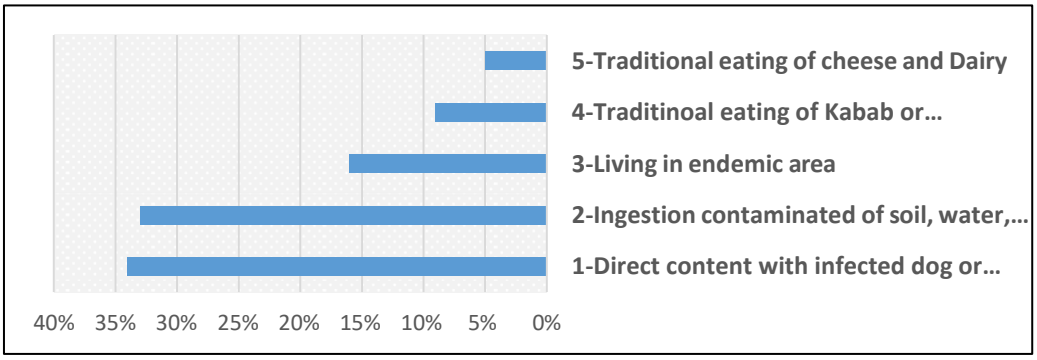
7/ Distribution of the study sample according to Past Surgical History:*Table (6).*

Past Surgical History	Frequency	The percentage %
Yes	15	16%
No	77	84%
Total	92	100

Source: Prepared by researchers based on the outputs of the SPSS statistical software package, 2023.

It is clear from Table (6))most patient carry no past surgical history ,

8/ Distribution of the study sample according to Risk Factors *Figure (3)*



Source: Prepared by researchers based on the outputs of the SPSS statistical software package, 2023.

It is clear from Figure (3), according to Risk Factors, that the majority of respondents answered Direct contact with infected dog or cat/anther animal, and they ranked first, with a rate of (34%).

9/ Distribution of the study sample according to the Diagnosis Method:

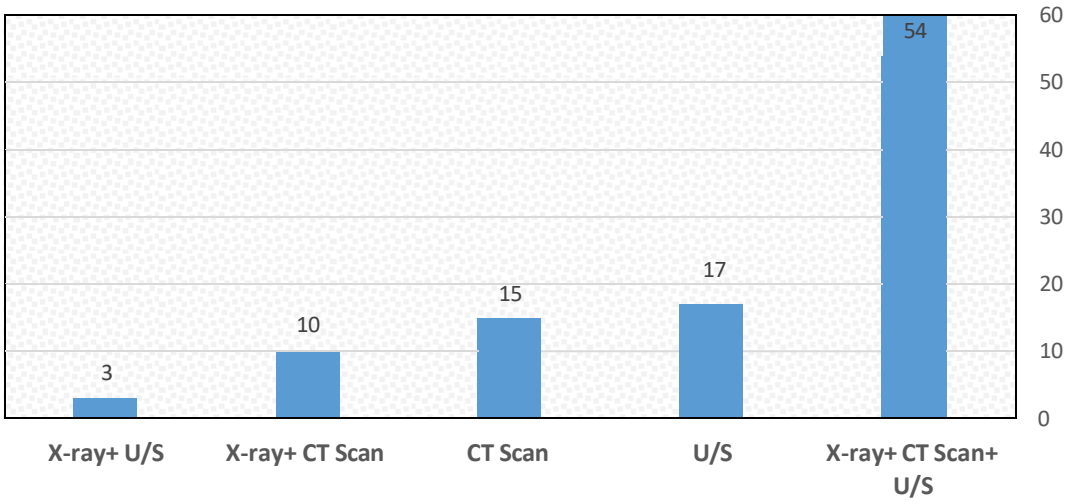
Table (7) Distribution of the study sample according to the Diagnosis Method.

Diagnosis Method	*Frequency*	*percentage%*
Laboratory	*34*	*37%*
Radiological	*92*	*100%*

Source: Prepared by researchers based on the outputs of the SPSS statistical software package, 2023.

It is clear from Table (7)), according to the Diagnosis Method, that the majority of respondents answered Radiological, and they ranked first, with a rate of (100%).

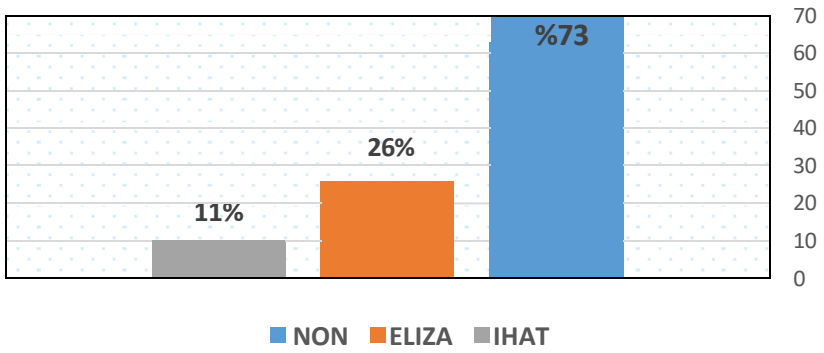
10/ Distribution of the study sample according to Radiological diagnosis :*Figure (4).*



Source: Prepared by researchers based on the outputs of the SPSS statistical software package, 2023.

It is clear from Figure (5), according to radiological, that the majority of respondents answered X-ray + CT scan + U/S, and they ranked first, with a rate of (54%).

11/ Distribution of the study sample according to the Diagnosis Method Laboratory:*Figure (5)*



Source: Prepared by researchers based on the outputs of the SPSS statistical software package, 2023.

It is clear from Figure (5), according to Lab Diagnosis ELIZA ranked first, with a rate of (26%).

12/ Distribution of the study sample according either operation done or not:

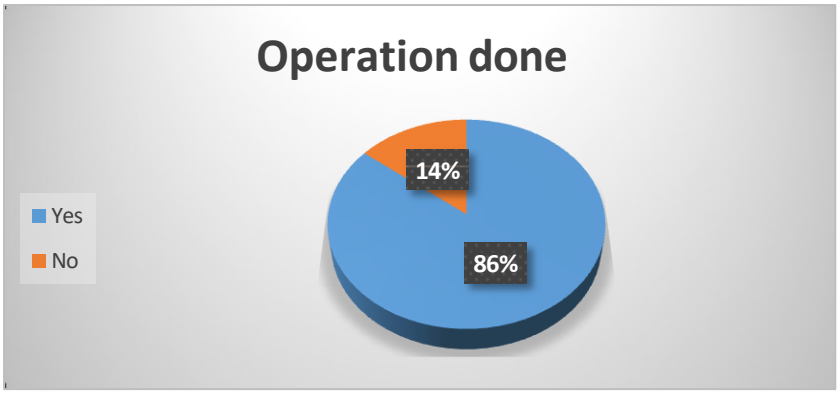


Figure (6)

It is clear from Figure (6) according to Operation done that the majority of patient was operated with a rate of (86%).

13/ Distribution of the study sample according to the treatment method: *Table (8).*

Treatment Method	Frequency	The percentage %
Medical	10	11%
Surgical	40	43%
Medical+ Surgical	42	46%
Total	92	100

It is clear from Table (8) and according to the Treatment Method, that the majority of patient answered Medical + Surgical, and they ranked first, with a rate of (46%).

14/ Distribution of the study sample according to Complication before the operation: *Table (9).*

Complication before the operation	Frequency	The percentage %
Yes	19	21%
No	73	79%
Total	92	100

.It is clear from Table (9) according to Complication before the operation only 21% presented with complication

15/ Distribution of the study sample according to Complication after the operation: *Table (10)*

Complication after the operation	Frequency	The percentage %
Yes	10	11%
No	82	89%
Total	92	100

It is clear from Table (10) according to Complication after the operation, most of them answered No, and they ranked first, with a rate of (89%).

16/ Distribution of the study sample according to Use treatment after the operation:

Table (11) Distribution of the study sample according to Use medical treatment after the operation.

Use treatment after the operation	Frequency	The percentage %
Yes	72	78%
No	20	22%

It is clear from Table (11) according to Use medical treatment after the operation, that the majority answered Yes, and they ranked first, with a rate of (78%).

17/distribution of the study sample according to Recurrent disease: *Table (12).*

Recurrent disease	Frequency	The percentage %
Yes	8	9%
No	84	91%
Total	92	100

It is clear from Table (12) according to Recurrent disease. Significant rate has recurrent

CHAPTER (5) : Discussion

Hydatid disease: *one of the important problems confronting the surgeons as known in general surgical literature, as well as , it's one of the common presenting problems but the laboratory diagnosis still neglected to most surgeon and most surgeon depend on radiological diagnosis, so the recurrence rate is significant also medical therapy should be concern pre and post surgery .*

this study and Sample size *: retrospective descriptive study for 92 consecutive patients who are presented or treated in amantalasemah either in governmental or private hospitals*

Study site and duration :*Amanat Alasemah Sana'a Yemen , privat or governmental medical centers (hospitals – lab-clinics))through the duration since Jun 2020 till May 2023*

Demographic and Geographic discussion: Our study show that females are more affected (54%). than male (46%), and and that the middle age group (15-64) years are the most, and they ranked first, with a rate of (85%) and and married social state take the most of sample(64%), and also most of them with average socioeconomic state (58%) ***Most cases of our study were live in Amanat Alasimah*** *(20%)) because our study was in that place and most and other sample was seen also in same place or travel from another governorate to* ***Amanat Alasimah_****Sana'a for treatment proposeAnd furthermore most patient was born in al Mehwit(20%)*

Clinical history discussion:according to Organ affected by hydatid cyst, that most of them are from the Liver (43%) then lung then combined then GIT and other organ in system percent), ***also***

according to Past Surgical History, that the majority answered No with a rate of (84%)

Risk Factors:*It is clear that the major Risk Factors or method after transmation IS: Direct contact with infected dog or cat/another animal, and they ranked first, with a rate of (34%). then -ingestion contaminated of soil, water, vegetables (33%) then* ***-living in endemic area*** *(16%)****-then traditional eating of kabab or uncooked meat*** *(9%)* ***then traditional eating of cheese and dairy (5%)***

Diagnosis*: (100%) diagnosed radiologically and* ***only 37% has confirmed on laboratory bases as ELIZA OR IHAT AND this is why recurrency is significant in our study, and furthermore the most common radiological method is sonography, X RAY AND CT SCAN (54%)*** *common method of Laboratory Method of Diagnosis according study is* ***ELIZA with a rate of (26****%).*

Treatment: *MOST patient was operated at the time of study (86%) other patient was under preparation or on waiting list or continue under medical treatment, and also the majority of patient operated in private, with a rate of (63%), and (78%) was take medical therapy after operation, also the majority of patient treated Medical + Surgical, with a rate of (46%).*

Complication*: It is clear), the Complicated cases before the operation only 21%, and only 5% and 11% complicated either during or post operation respectfully*

Recurrence :*.according to Recurrency .****Only 9% has recurrent disease, the majority of them treated medically with a rate of (63%).*** *another patient under observation or surgically treated.*

CHAPTER (6) : Conclusion

Hydatid disease is common disease affect female than male and high rate in Amanat Alasema Sana'a and al Mehwit in average married population. commonly transmitted by direct contact with dogs and other animal and totally depend on radiological diagnosis and only near third surgeon depend on laboratory diagnosis specially ELIZA and near half has been taken medical therapy pre or post operation.

And so the recurrent rate was higher than expected in cases omit full investigation specially laboratory beside radiological diagnosis and als post operative medical therapy was mandatory

CHAPTER (7) : Recommendation

1- Early presentation, diagnosis and proper management is necessary for good outcome.

2- In hydatid disease it's highly recommend radiological and laboratory investigation before decision of treatment, because of high recurrent rate in cases which omit lab. Diagnosis or medical treatment.

3- Medical therapy before and after surgical intervention is highly recommended.

4- Laboratory investigation should be available in all lab Centers

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