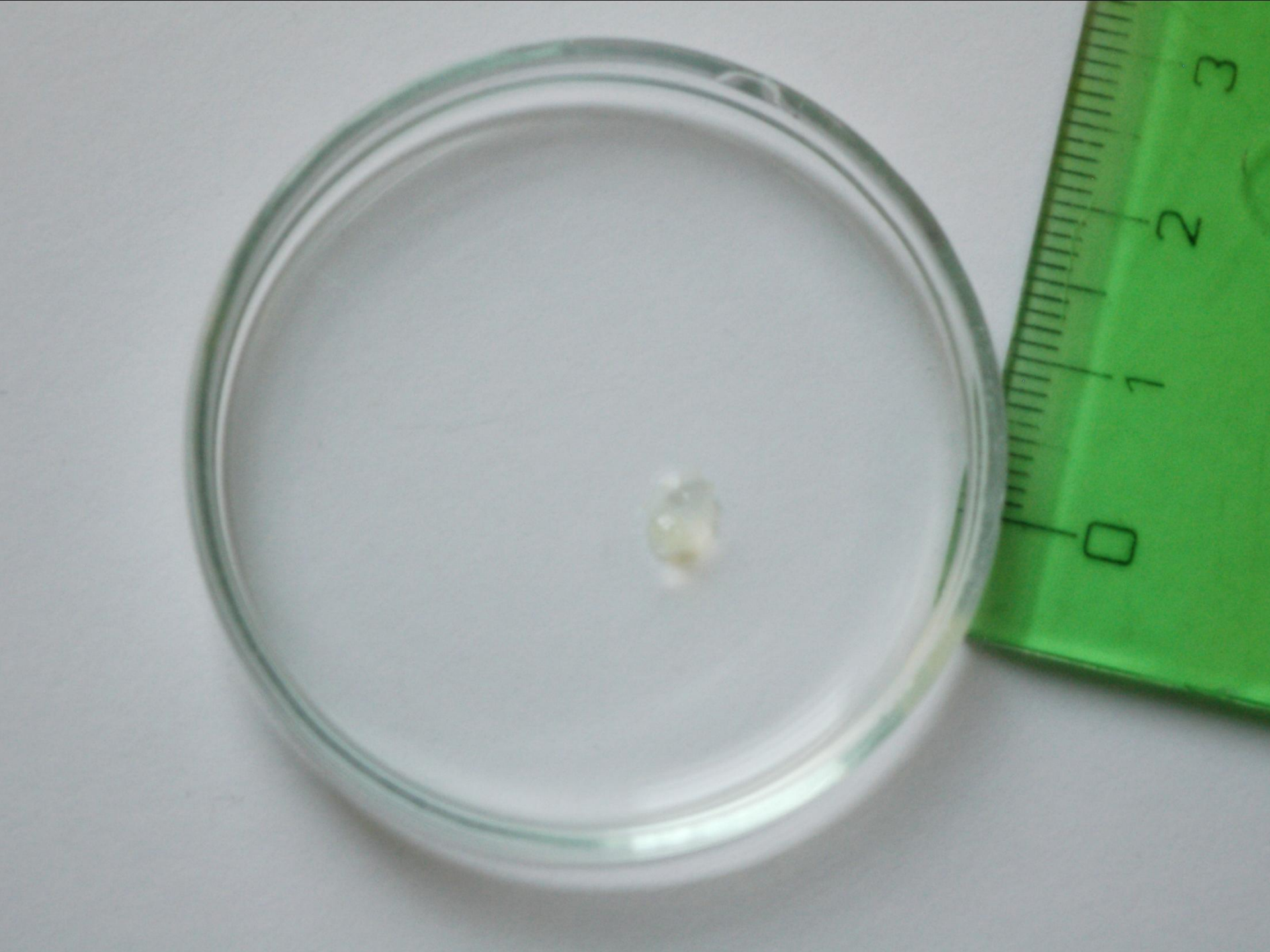
TISSUE HELMINTIC INFECTIONS

Tropical diseases, December 14, 2011

František Stejskal

Oddělení tropické medicíny
III. klinika infekčních a tropických nemocí
1.LF UK a FN Na Bulovce
tel. 2 6608 2440 (ambulance)
tel. 2 2496 8523 (laboratoř)
Email: fstej@lf1.cuni.cz

CLINICAL CASE 1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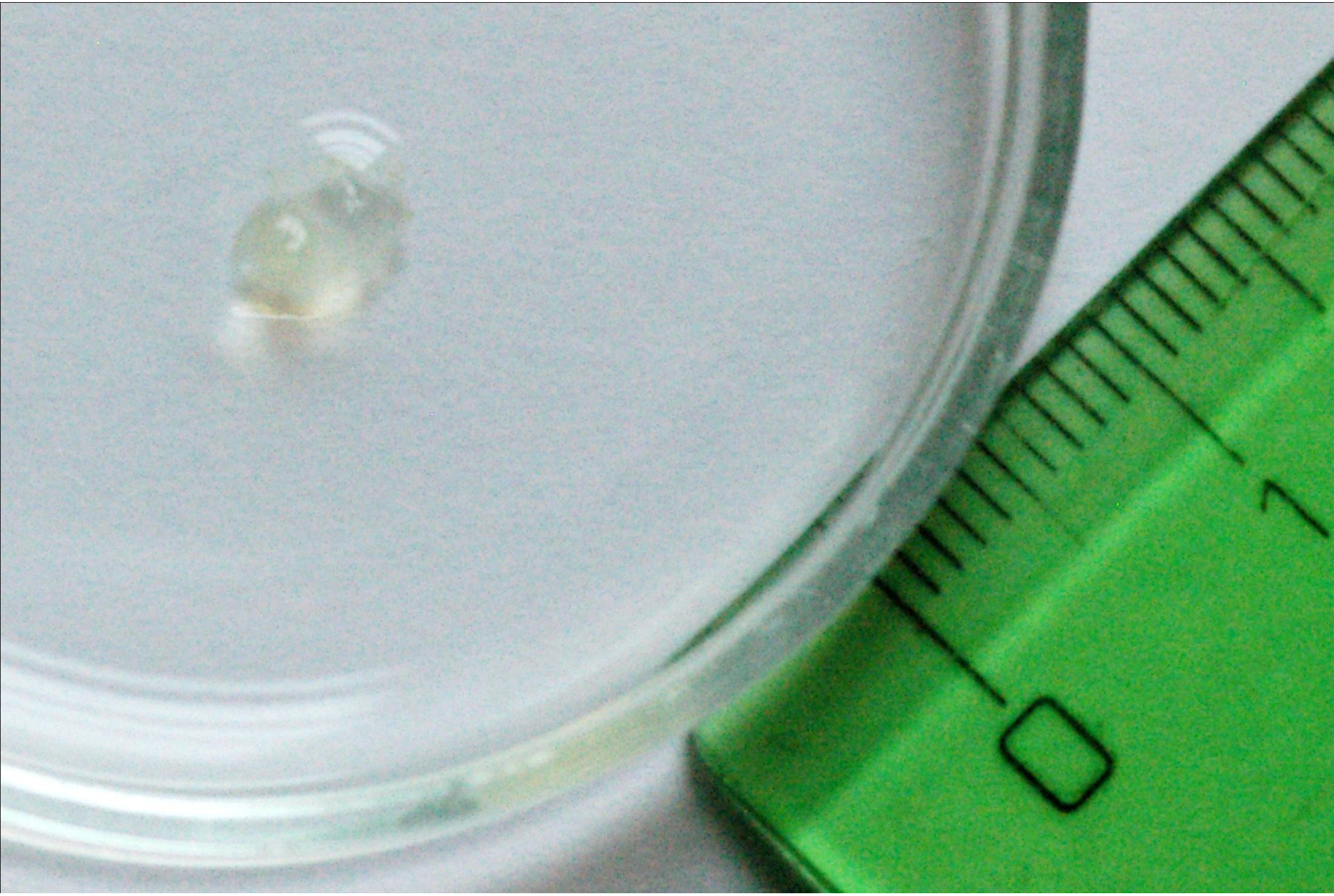

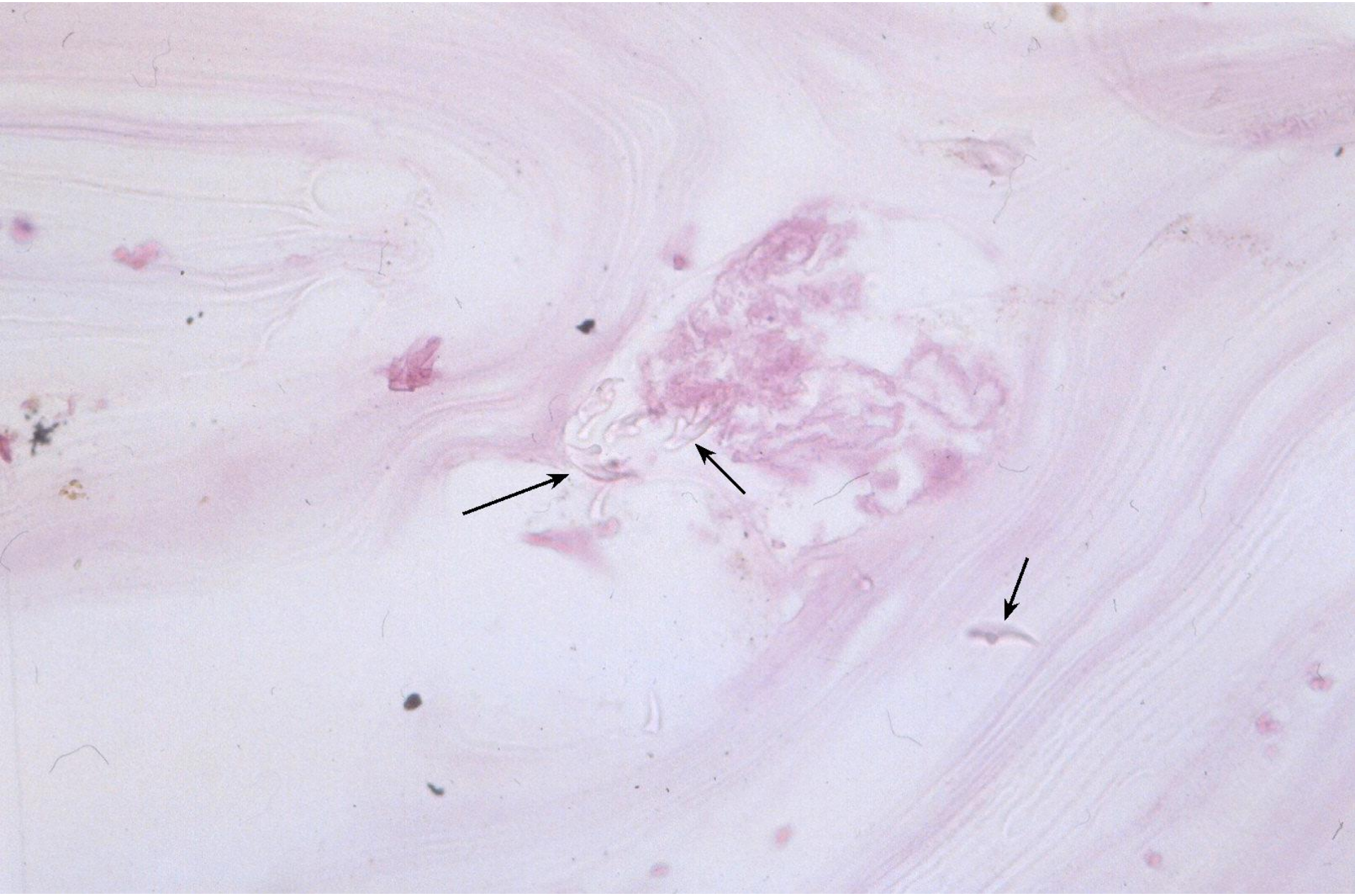

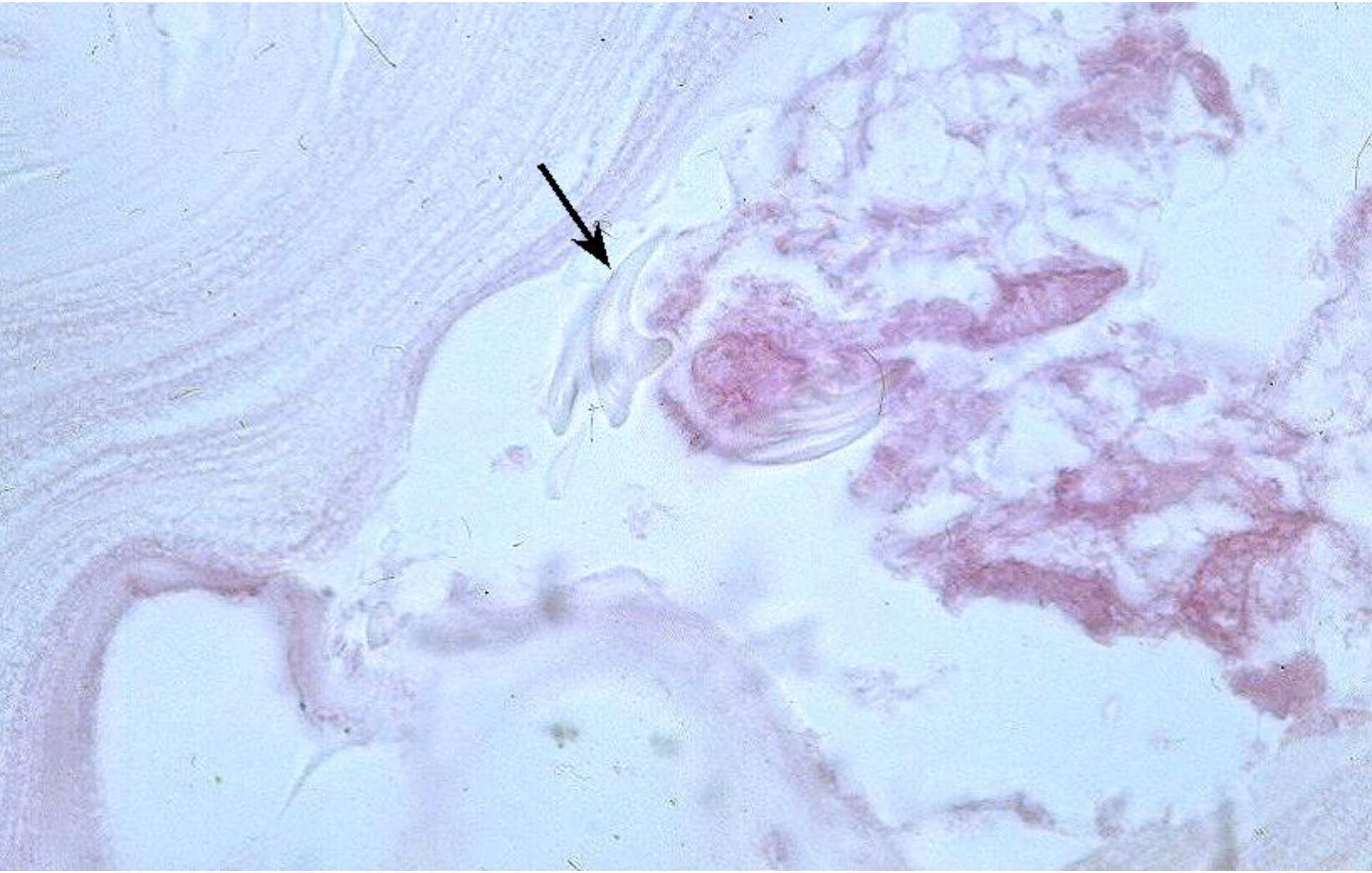

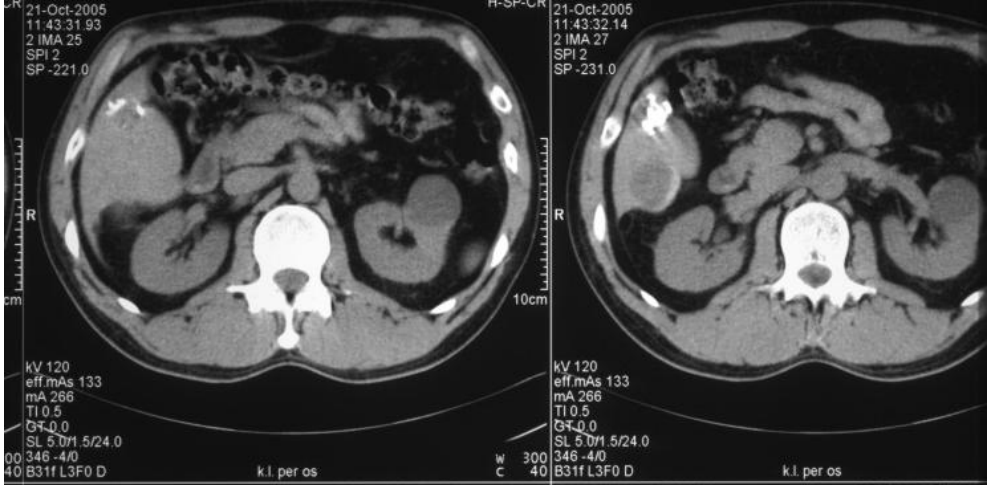
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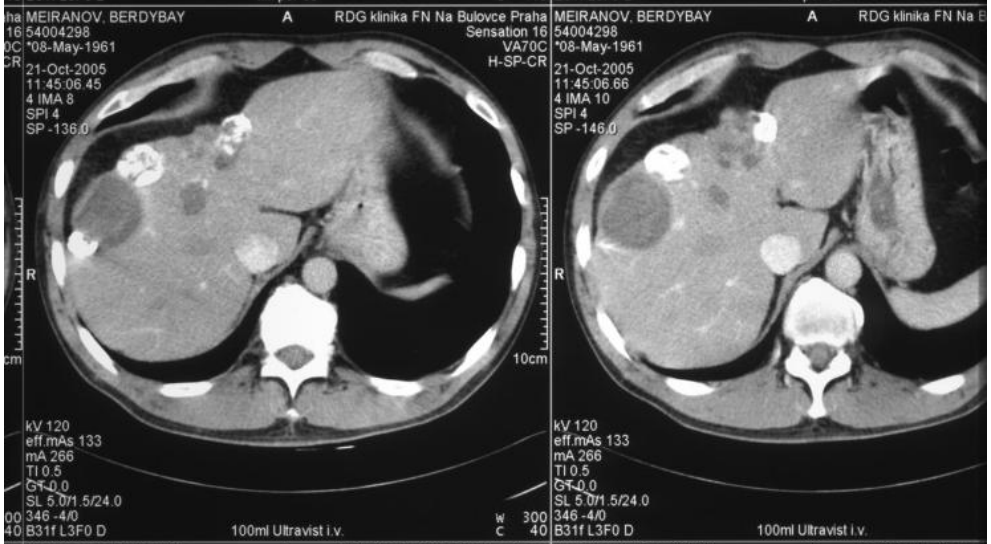
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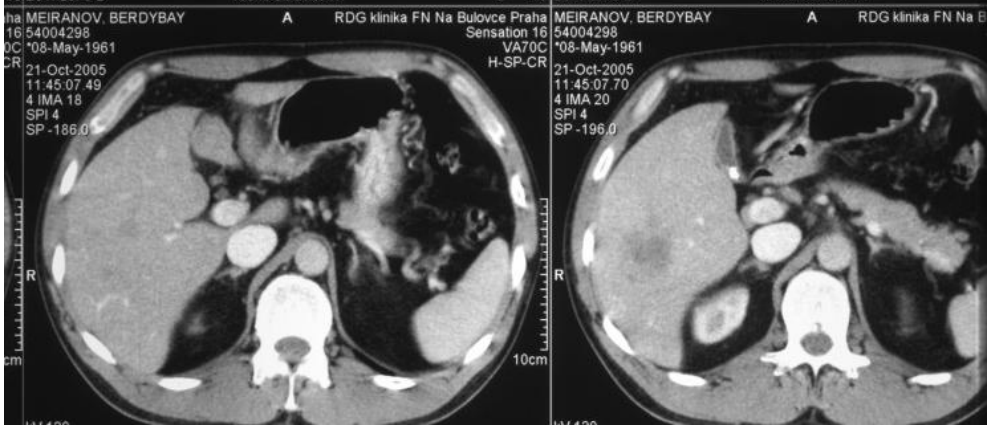
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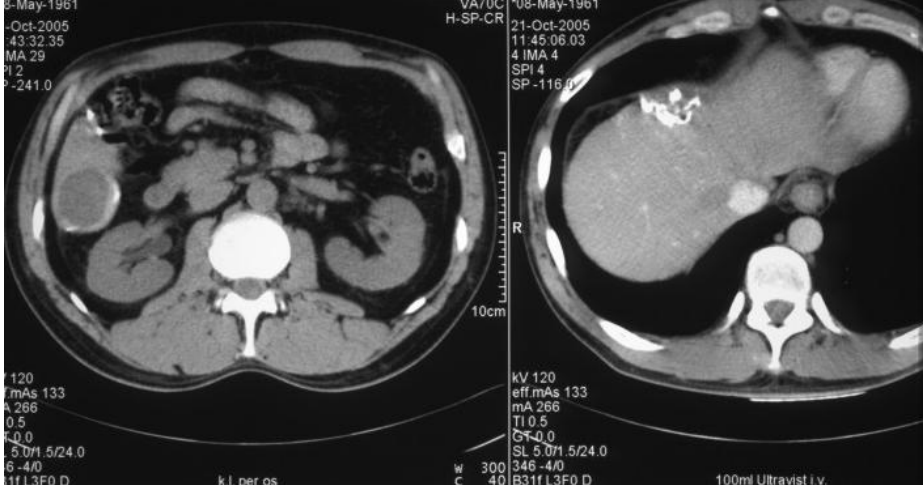
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100ml Ultravist i.v.
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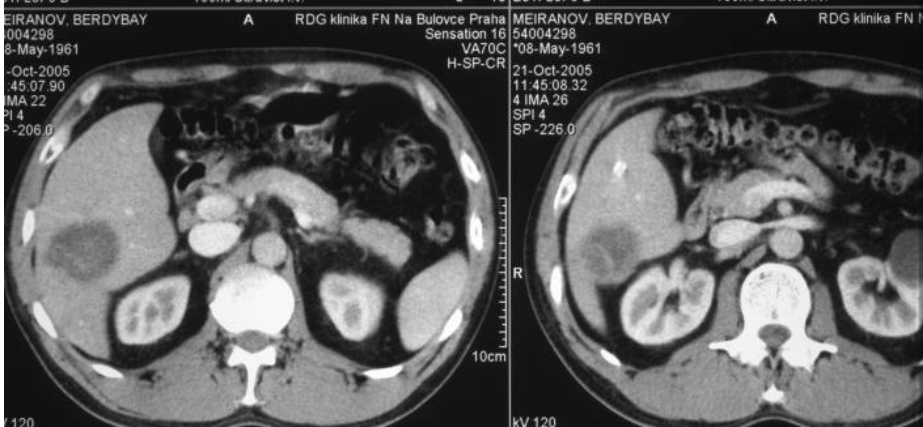
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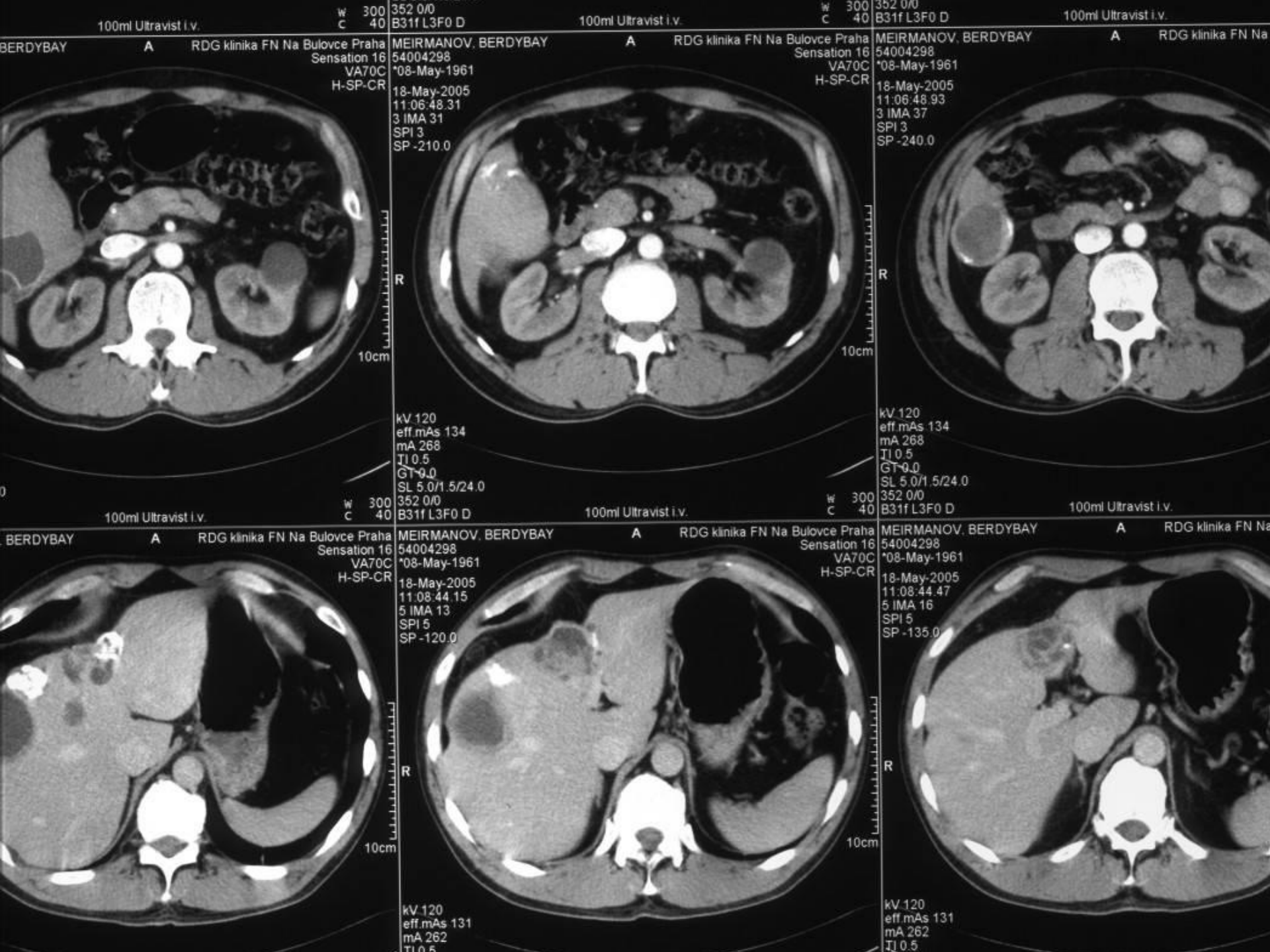
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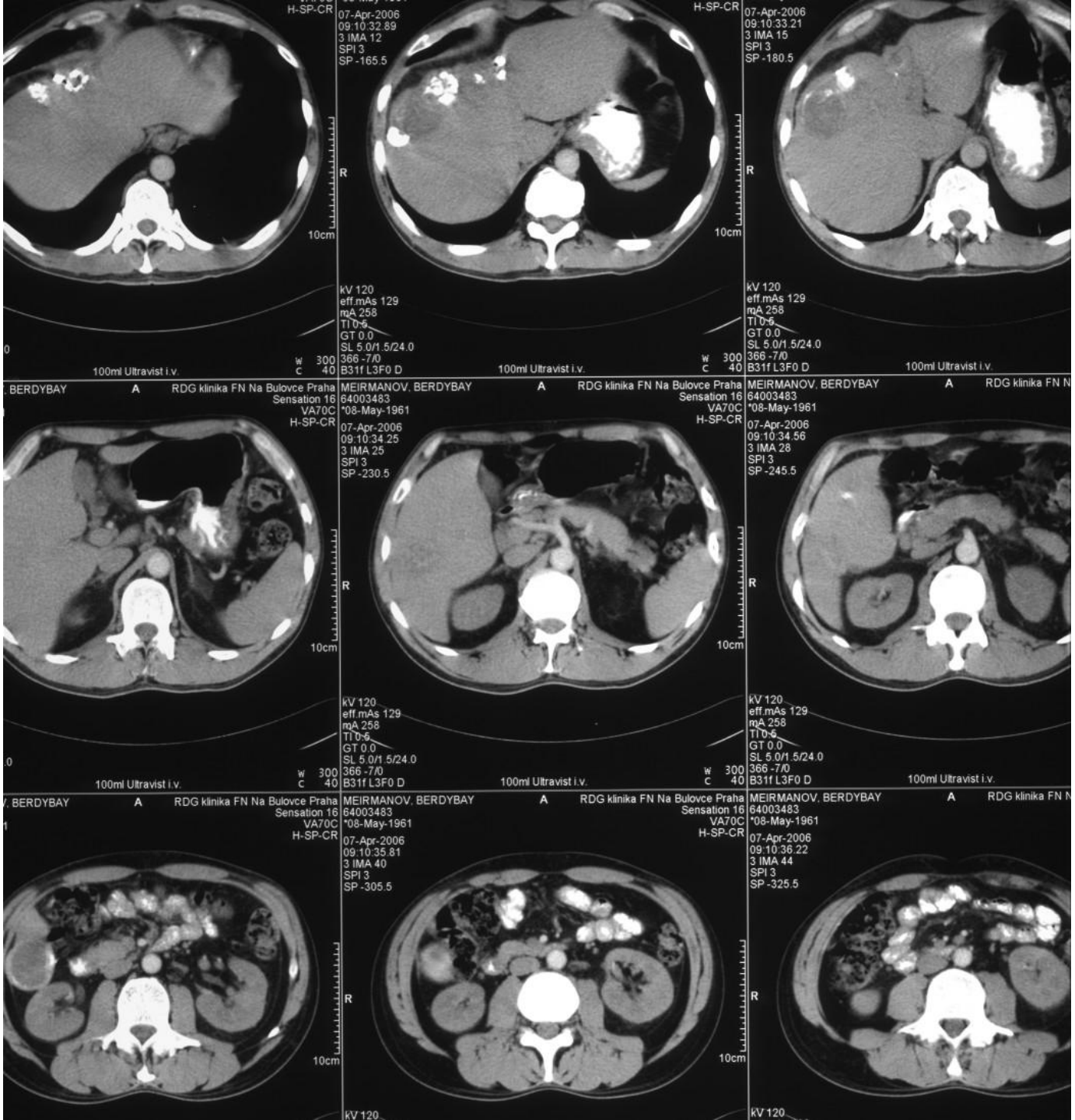
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SP -180.5
09:10:34.25
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SP -230.5
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SP -245.5
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SP -305.5
09:10:36.22
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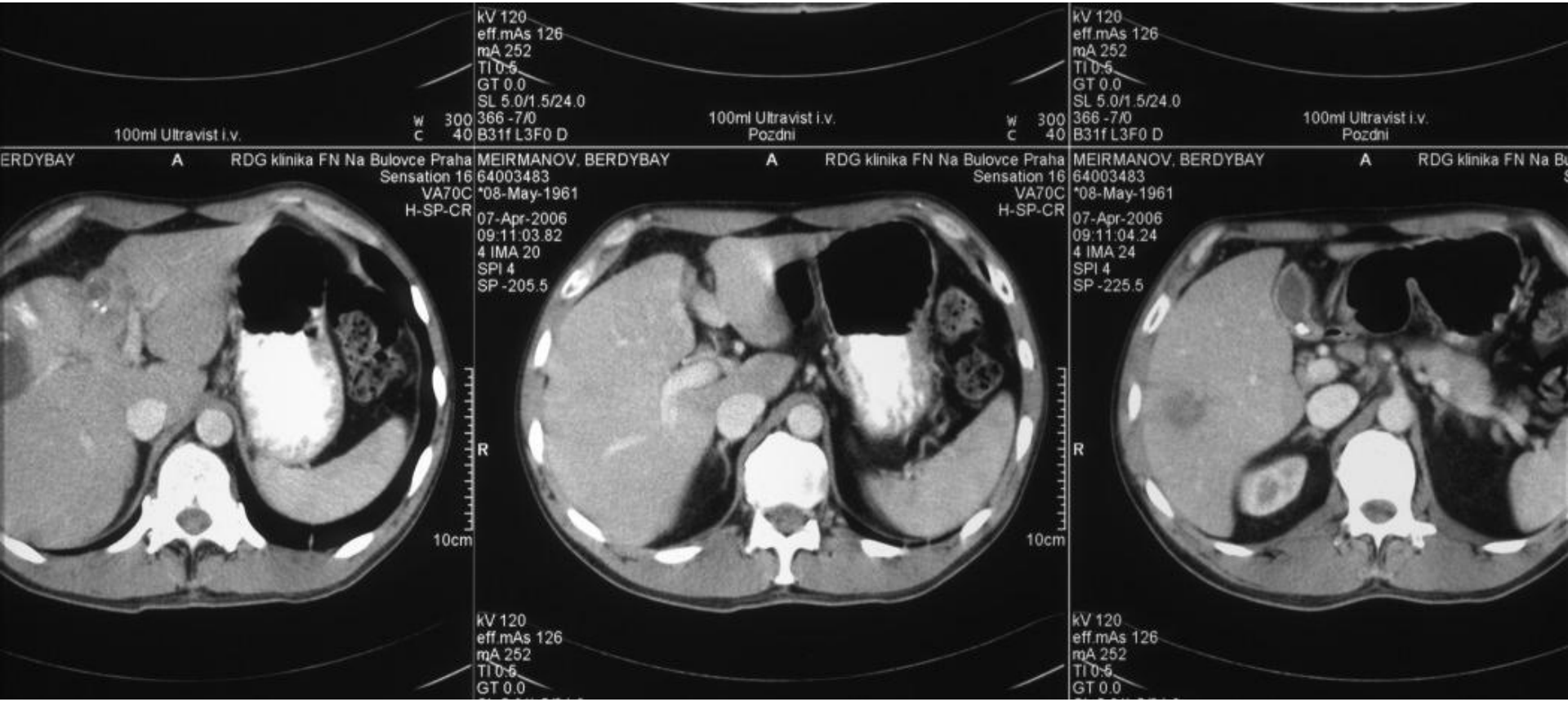
C 40
R
10cm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C 40
ERDYBAY
A
RDG klinika FN Na Bulovce Praha
Sensation 16
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H-SP-CR
R
10cm
MEIRMANOV, BERDYBAY
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07-Apr-2006
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Pozdni
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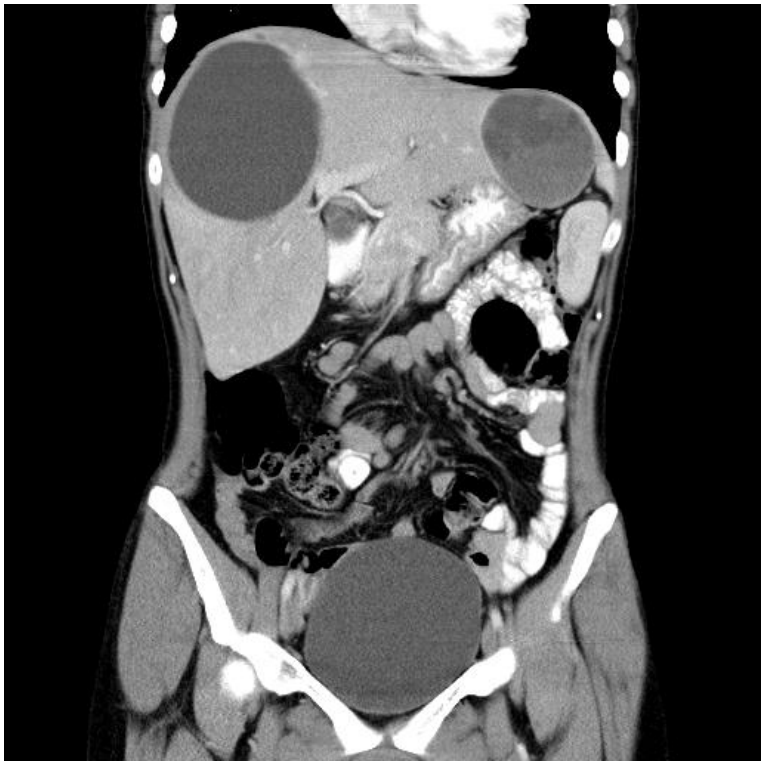
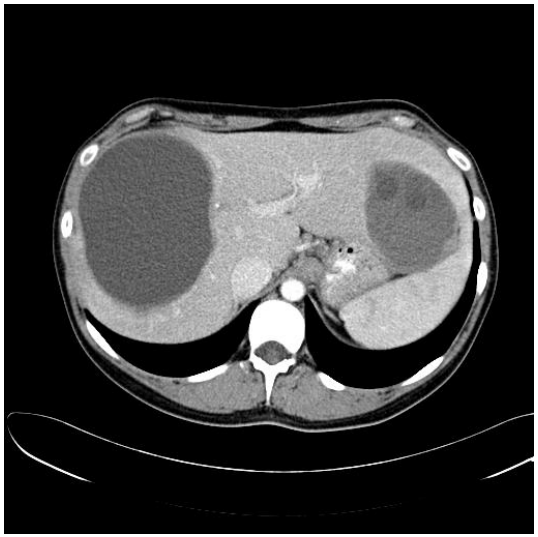
SP -225.5

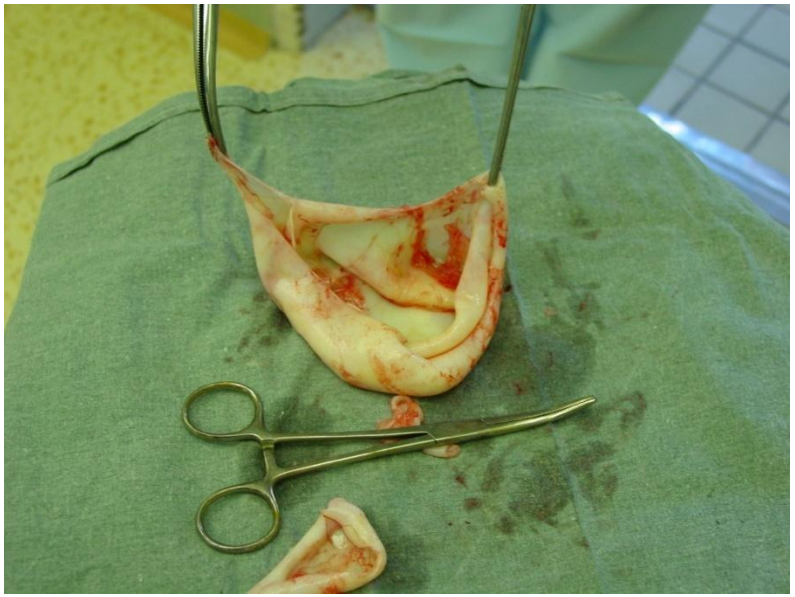
CLINICAL CASE 2

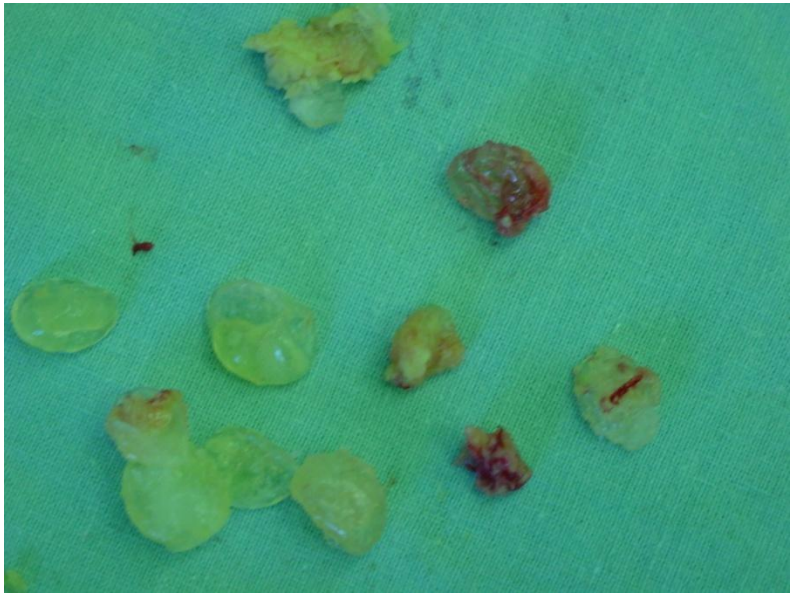




CT SCAN OF LIVER – LIVER CYSTS

HYDATIDE CYSTS





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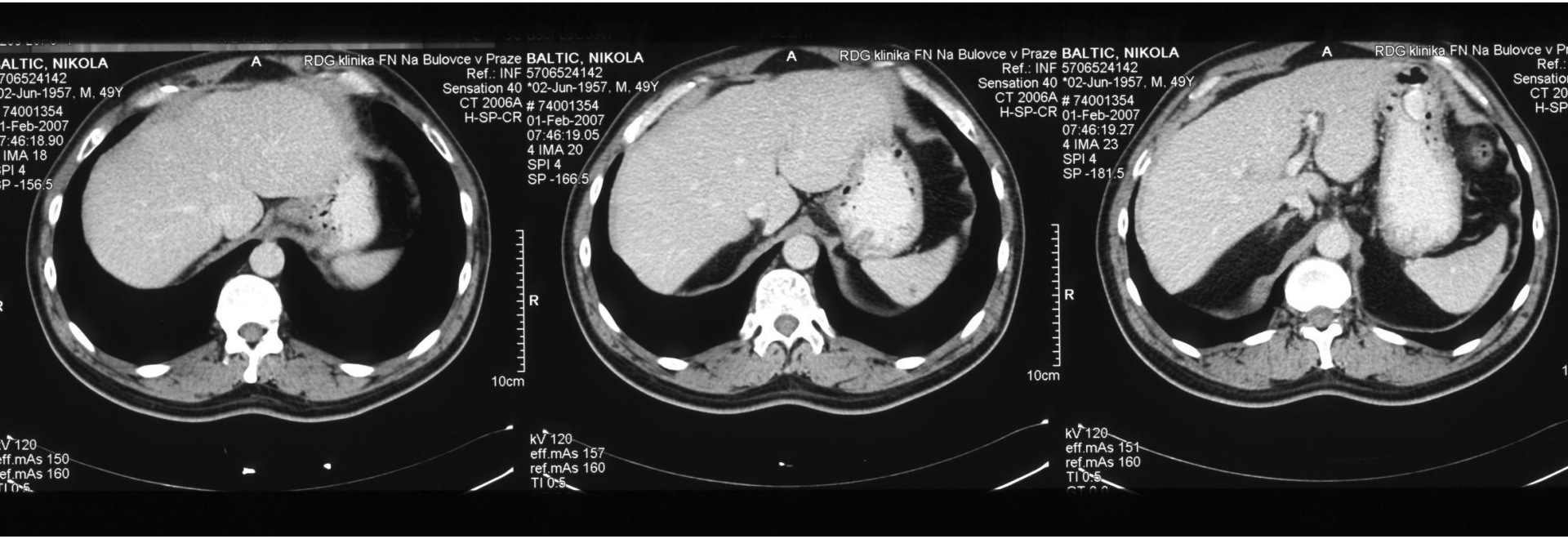
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1-Feb-2007
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PI 4
P -156.5
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RDG klinika FN Na Bulovce v Praze
BALTIC, NIKOLA
Ref.: INF 5706524142
Sensation 40 *02-Jun-1957, M, 49Y
CT 2006A # 74001354
H-SP-CR 01-Feb-2007
07:46:19.05
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SP -166.5
R
10cm
kV 120
eff.mAs 157
ref.mAs 160
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A
RDG klinika FN Na Bulovce v Praze
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SP -181.5
R
10cm
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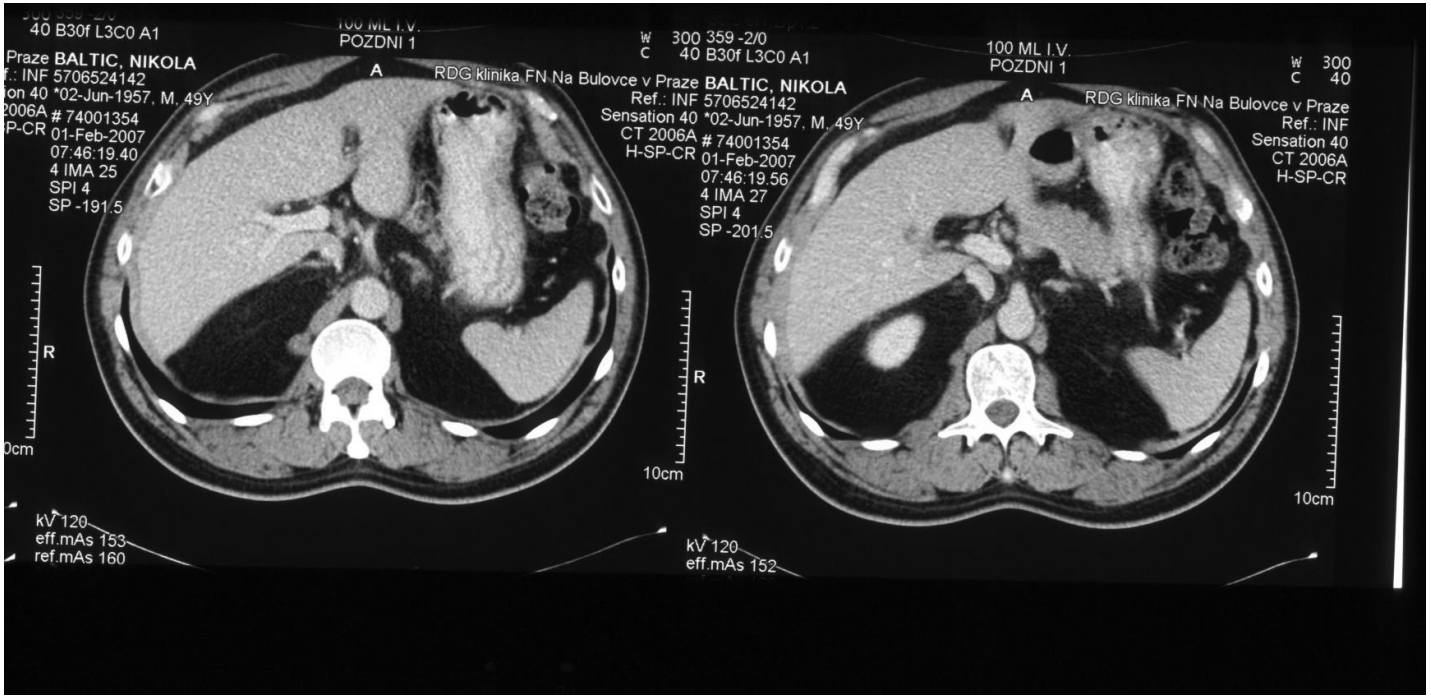
Ref.:
Sensatio
CT 20
H-SP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2006A # 74001354
P-CR 01-Feb-2007
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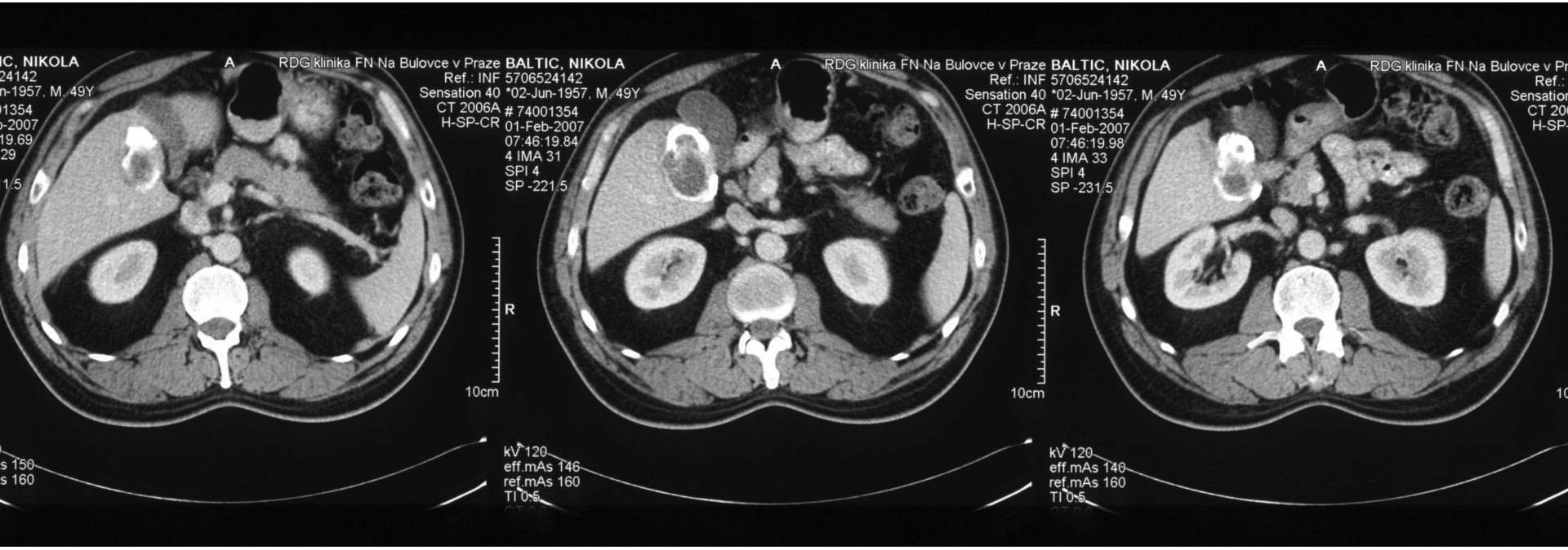
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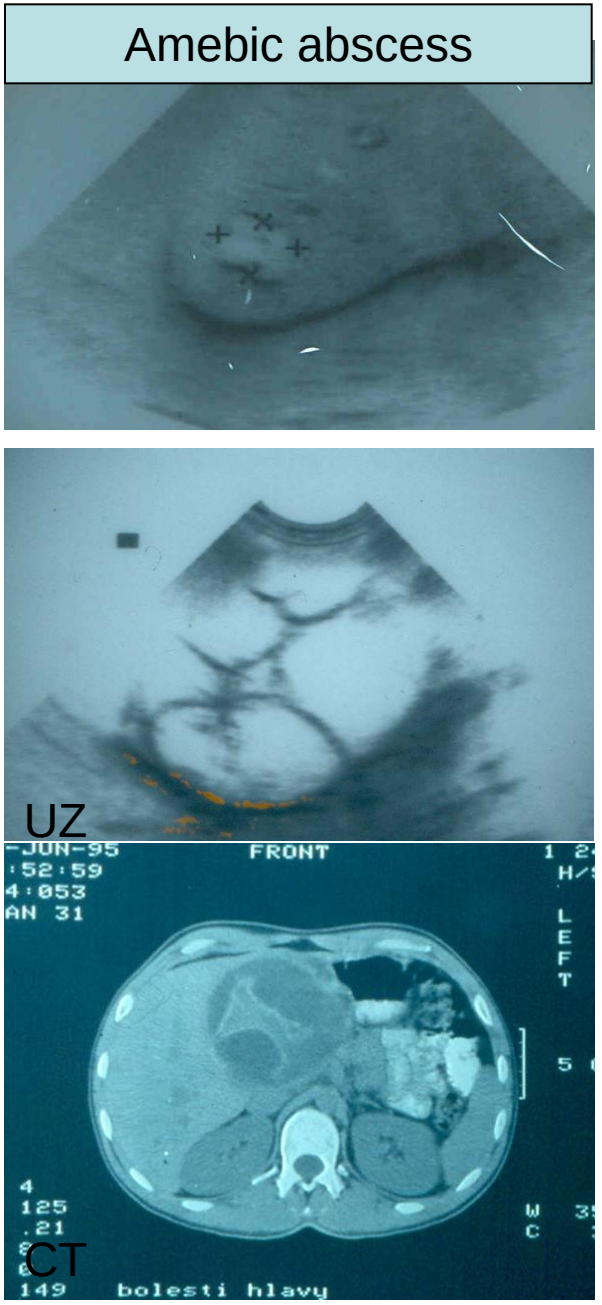
DIFFERENTIAL DIAGNOSIS OF THE FOCAL LIVER LESION

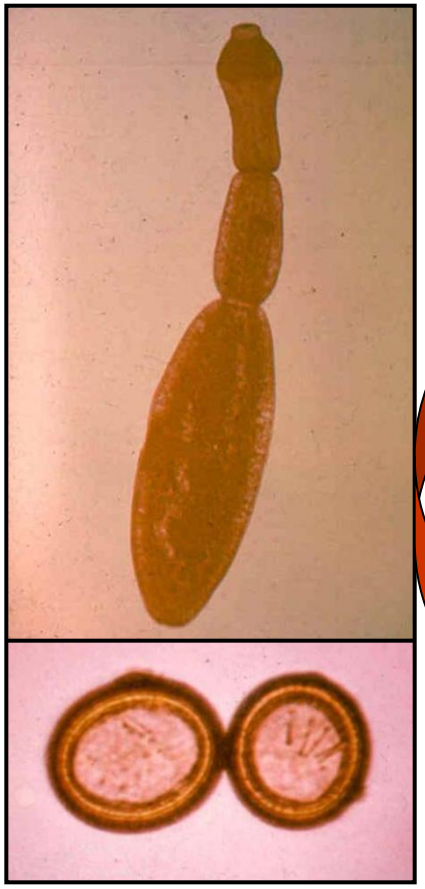
- Amebic abscess
- Bacterial pyogenic abscess
- Tuberculoma
- Mycotic abscess (histoplasmosis, coccidiodomycosis, aspergilosis)
- Hepatoma (alpha-fetoprotein)
- Tumor metastasis
- Hemangioma
- Benigne cyst
- Echinocccal (hydatid) cyst

Red – fever is common



Hydatid cysts:

LIFE CYCLE OF ECHINOCOCCOSIS



Echinococcus granulosus
Adult tapeworm and eggs

Definitive host (dog)

Intermediate host (ship)

Hydatide cyst & **protoscolexes**

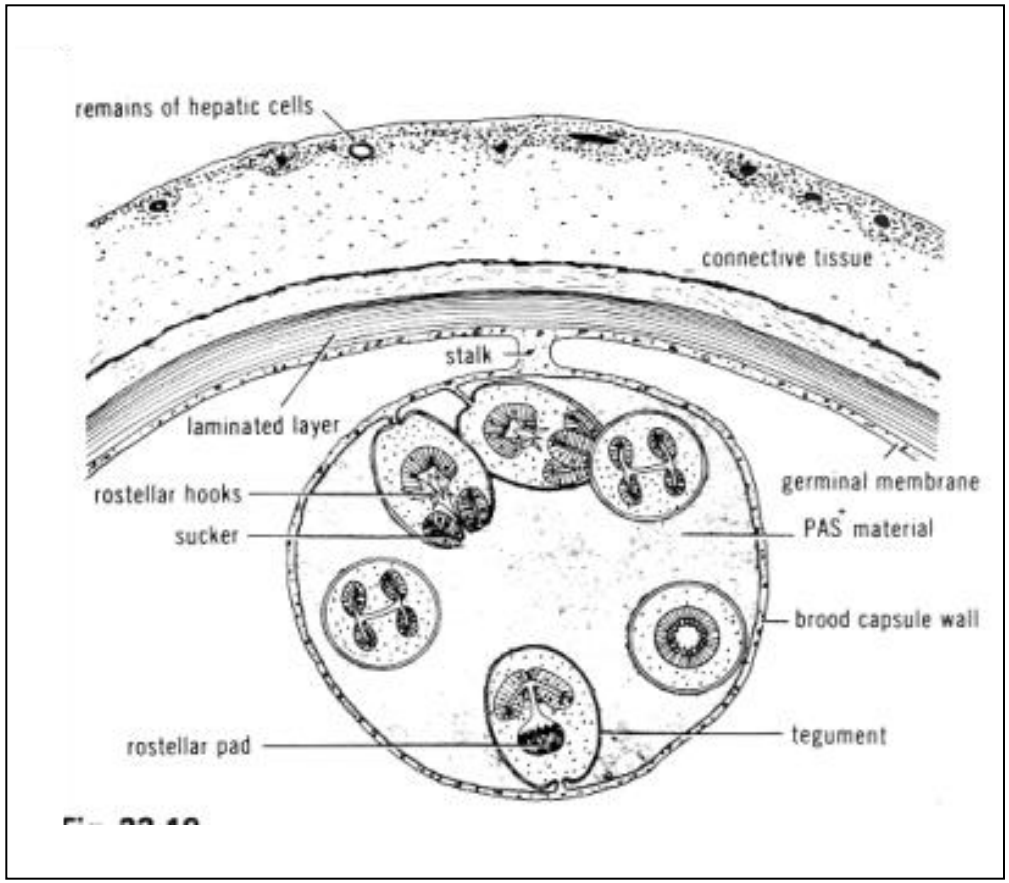
ECHINOCOCCOSIS

- ***Echinococcus granulosus*** (Batsch -1786)
  worldwide distribution, no in the CZ
  cystic hydatidosis
- ***Echinococcus multilocularis*** (Leuckart -1863)
  northern haemisphere, in the Central Europe in foxes and dogs (rodents intermediate host)
  alveolar hydatidosis
- ***Echinococcus vogeli***
  Central and South America, (60 cases)
  polycystic hydatidosis
- ***Echinococcus oligarthrus***
  S. America, sporadic
  polycystic hydatidosis

Alveolar hydatidosis

DEVELOPMENT OF HYDATID CYSTS

- Protoskolexes: 400 000 in 1 mm^3
- Cyst is growing very slowly - 10 cm in 30 years



Clinical Manifestations

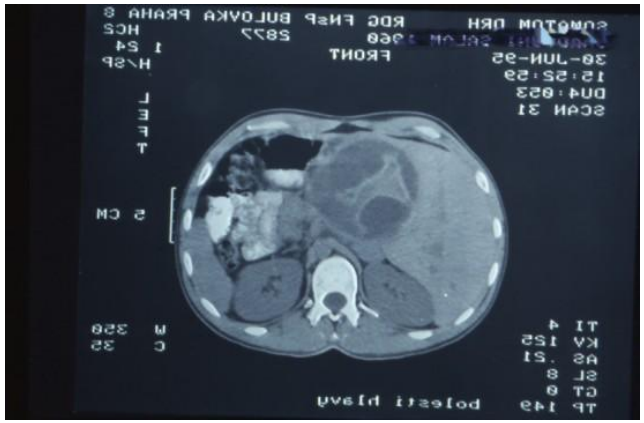
- Slowly enlarging echinococcal cysts generally remain asymptomatic. The liver and the lungs are the most common sites of these cysts.
- The liver is involved in about two-thirds of *E. granulosus* infections and in nearly all *E. multilocularis* infections.
- Patients with hepatic echinococcosis most often present with abdominal pain or a palpable mass in the right upper quadrant.
- Compression of a bile duct may mimic recurrent cholelithiasis, and biliary obstruction can result in jaundice.
- Rupture of or episodic leakage from a hydatid cyst may produce fever, pruritus, urticaria, eosinophilia, or anaphylaxis.
- Pulmonary hydatid cysts may rupture into the bronchial tree or peritoneal cavity and produce cough, chest pain, or hemoptysis.
- Rupture of hydatid cysts may lead to dissemination of protoscolices.
- Other presentations are:
  - bone (invasion of the medullary cavity with slow bone erosion producing pathologic fractures)
  - CNS (space-occupying lesions), the heart (conduction defects)
  - pelvis (pelvic mass).
- *E. multilocularis* present as a slowly growing hepatic tumor, with progressive destruction of the liver.

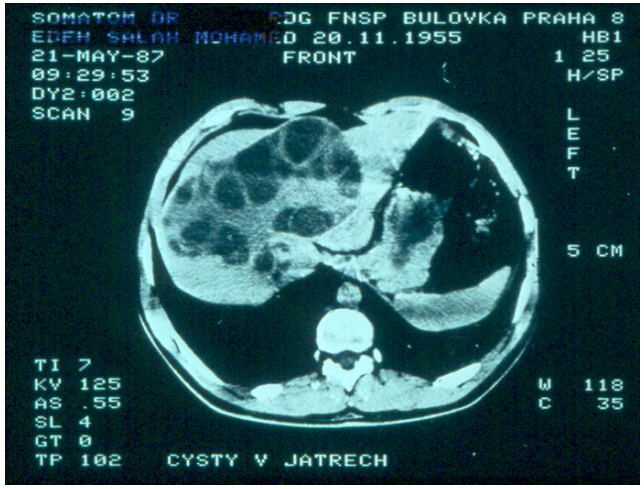
LIVER HYDATID DISEASE

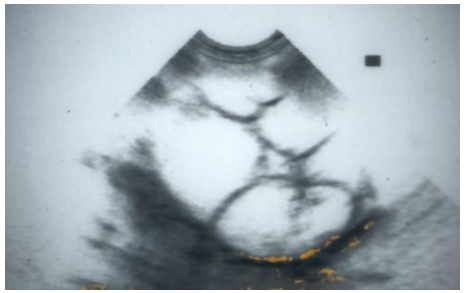
- 80 % of cysts in the right liver lobe
- Hyperbillirubinemia
- Hepatitis
- Cirhosis
- Risc of perforation:
  - Dissemination
  - Anaphylactic shock

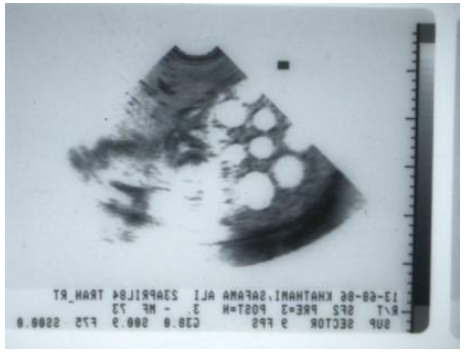
HYDATID CYSTS

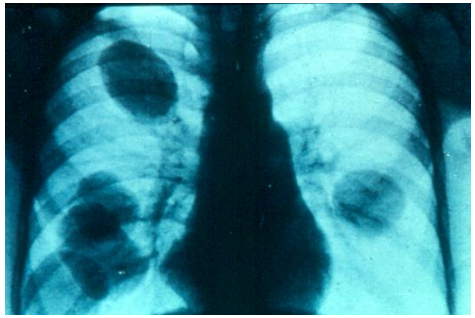
- Pacient from Tunis, asymptomatic
- Serology positive
- Eosinophilia not detected



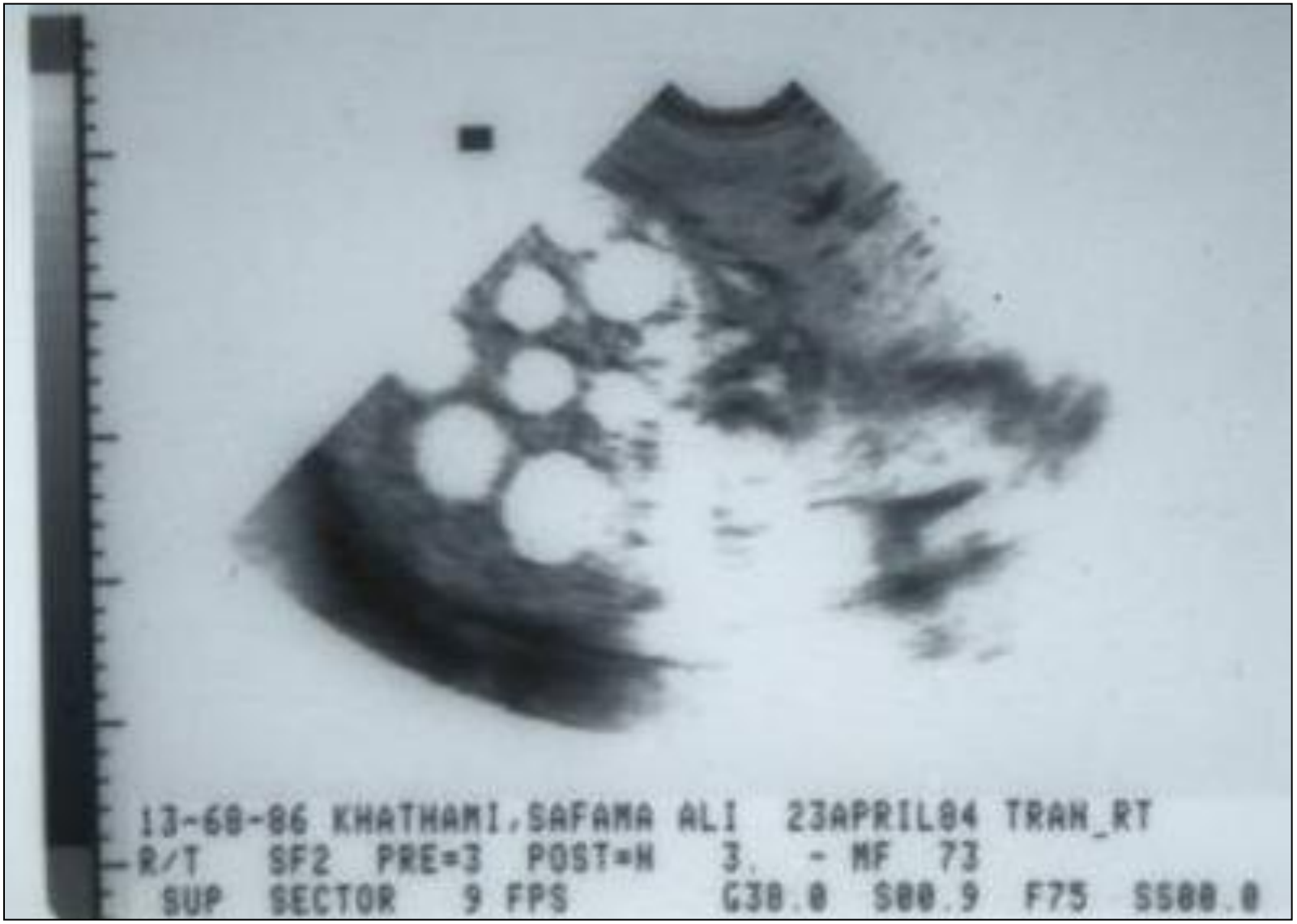




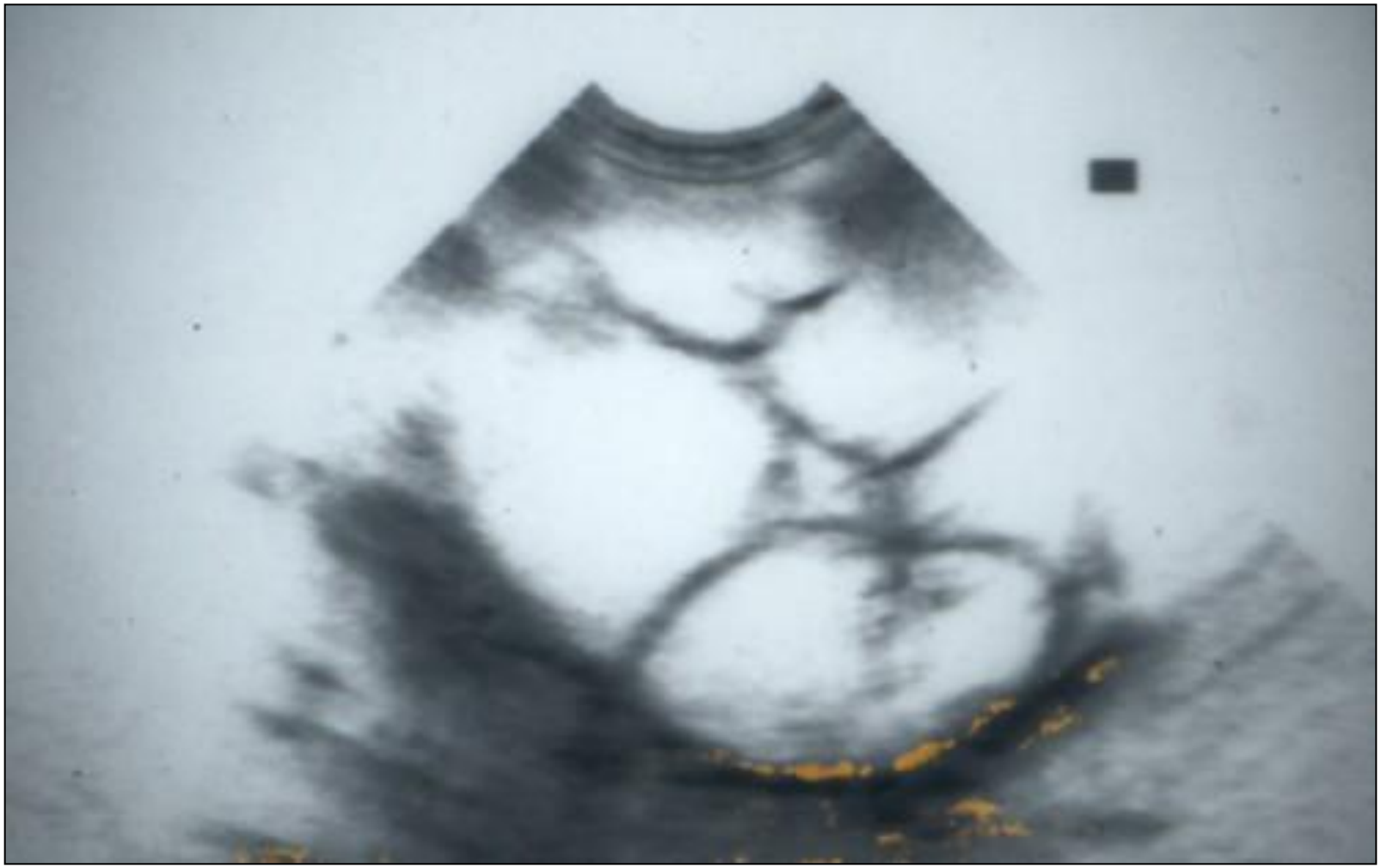




JATERNÍ HYDATIDÓZA - UZ



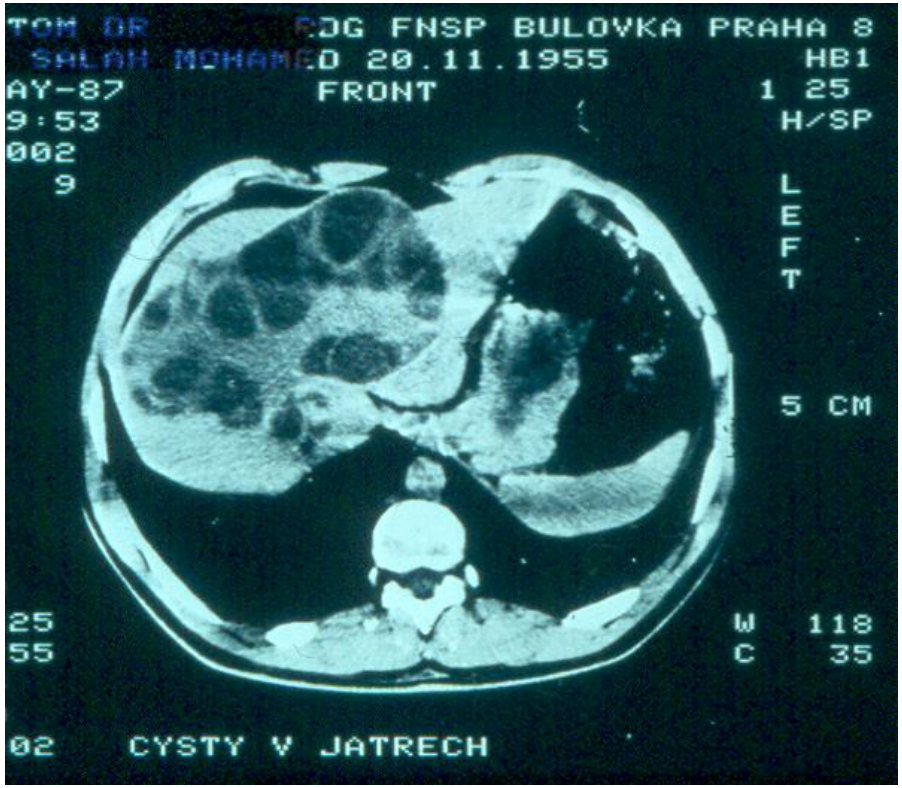
JATERNÍ HYDATIDÓZA - UZ

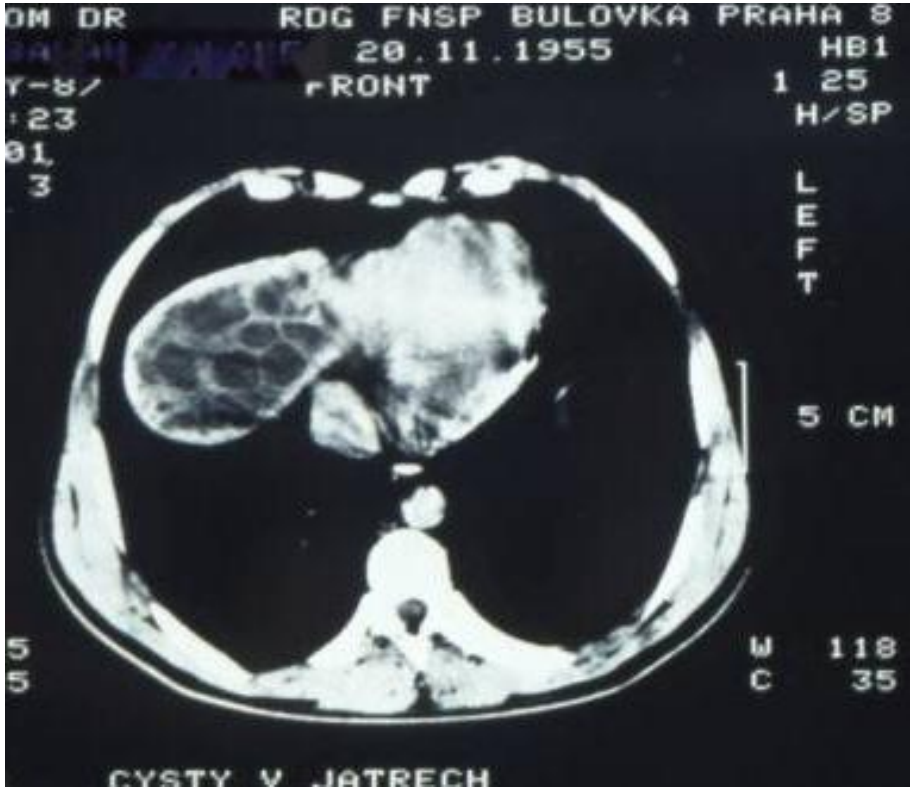


JATERNÍ HYDATIDÓZA - CT

- Pacient z Tuniska s asymptomatickou jaterní hydatidovou cystou
- Serologie pozitivní na hydatidózu
- Eosinofílie nebyla přítomna

JATERNÍ HYDATIDÓZA - CT





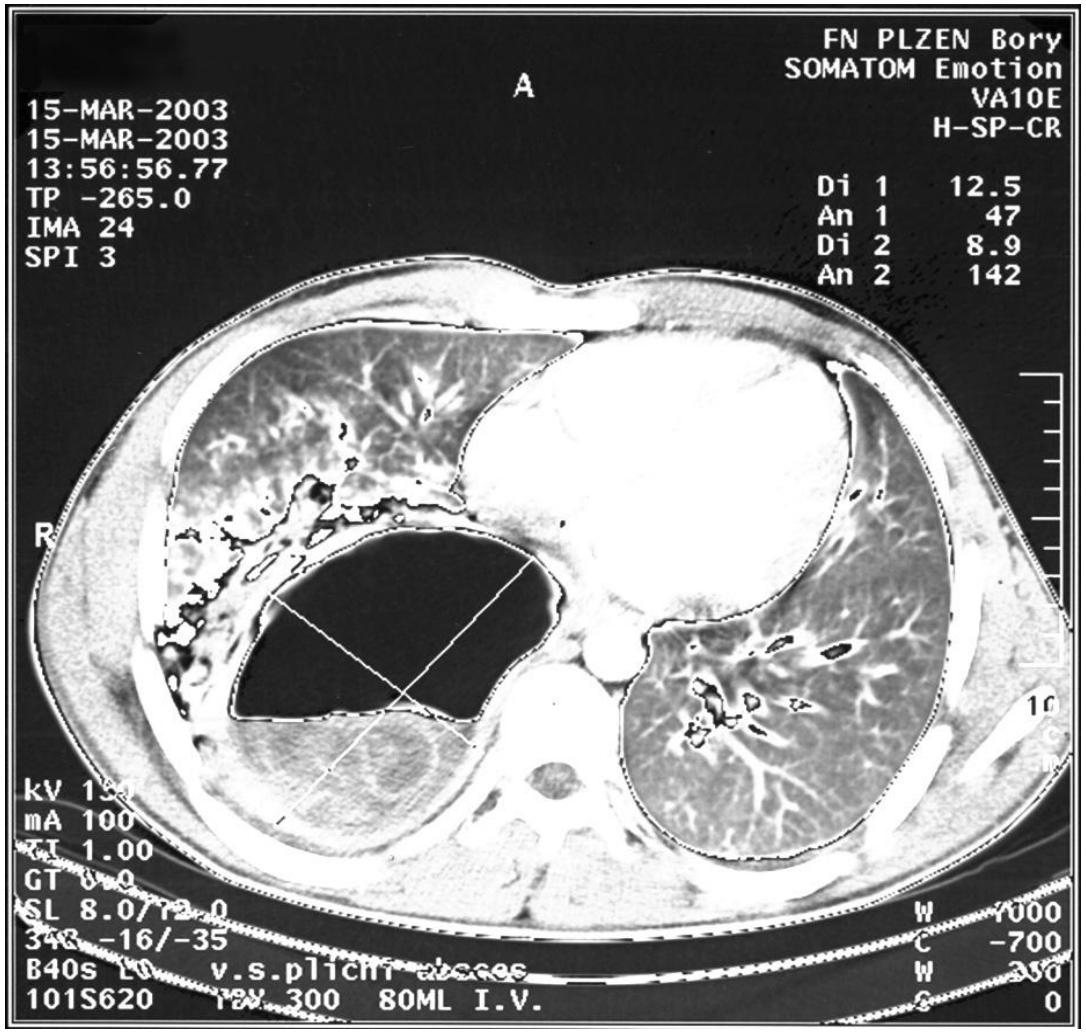
HYDATIDÓZA LEDVIN - NEFREKTOMIE

PLICNÍ HYDATIDÓZA - RTG

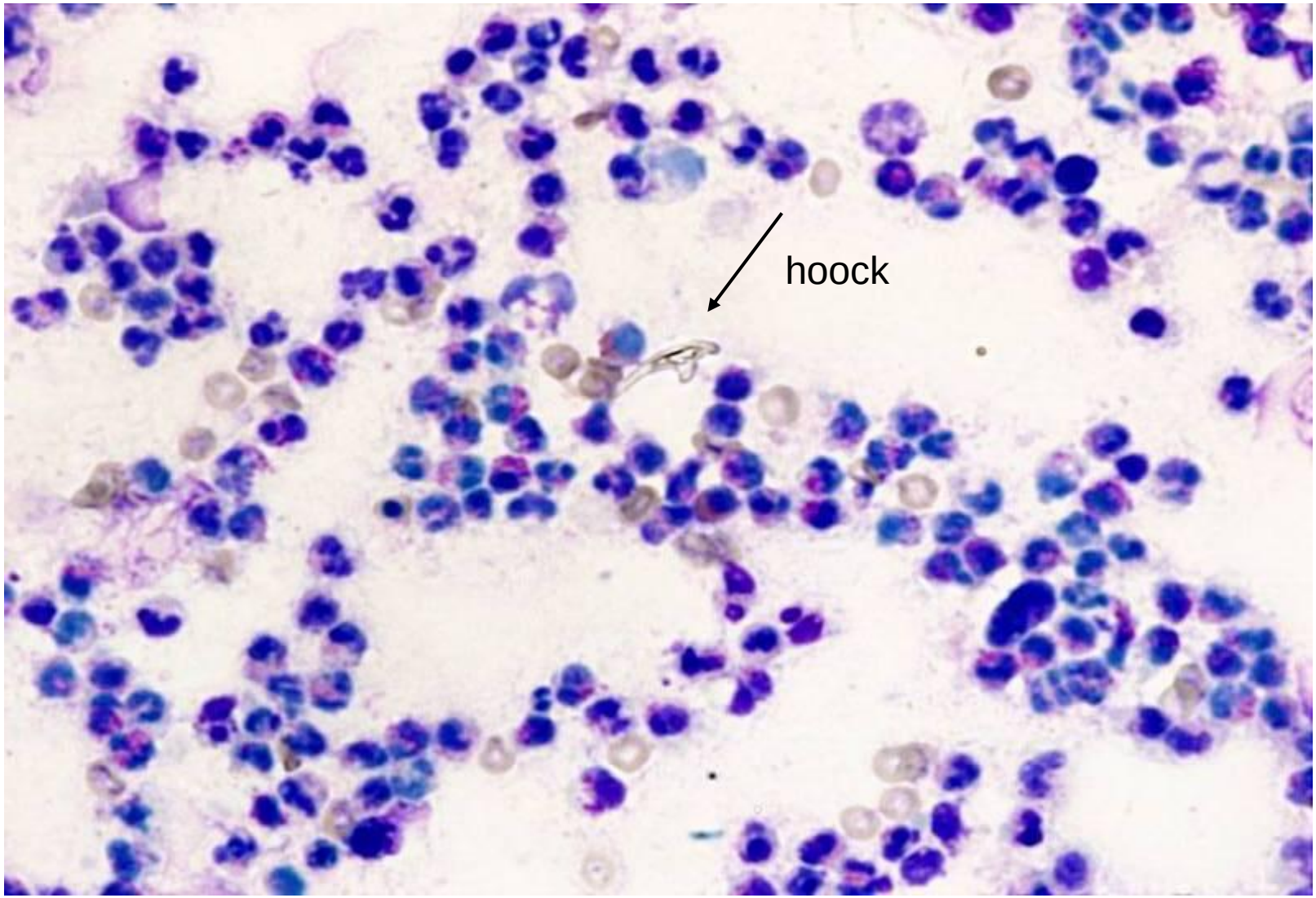
LUNG HYDATID CYST

X - ray

CT scan

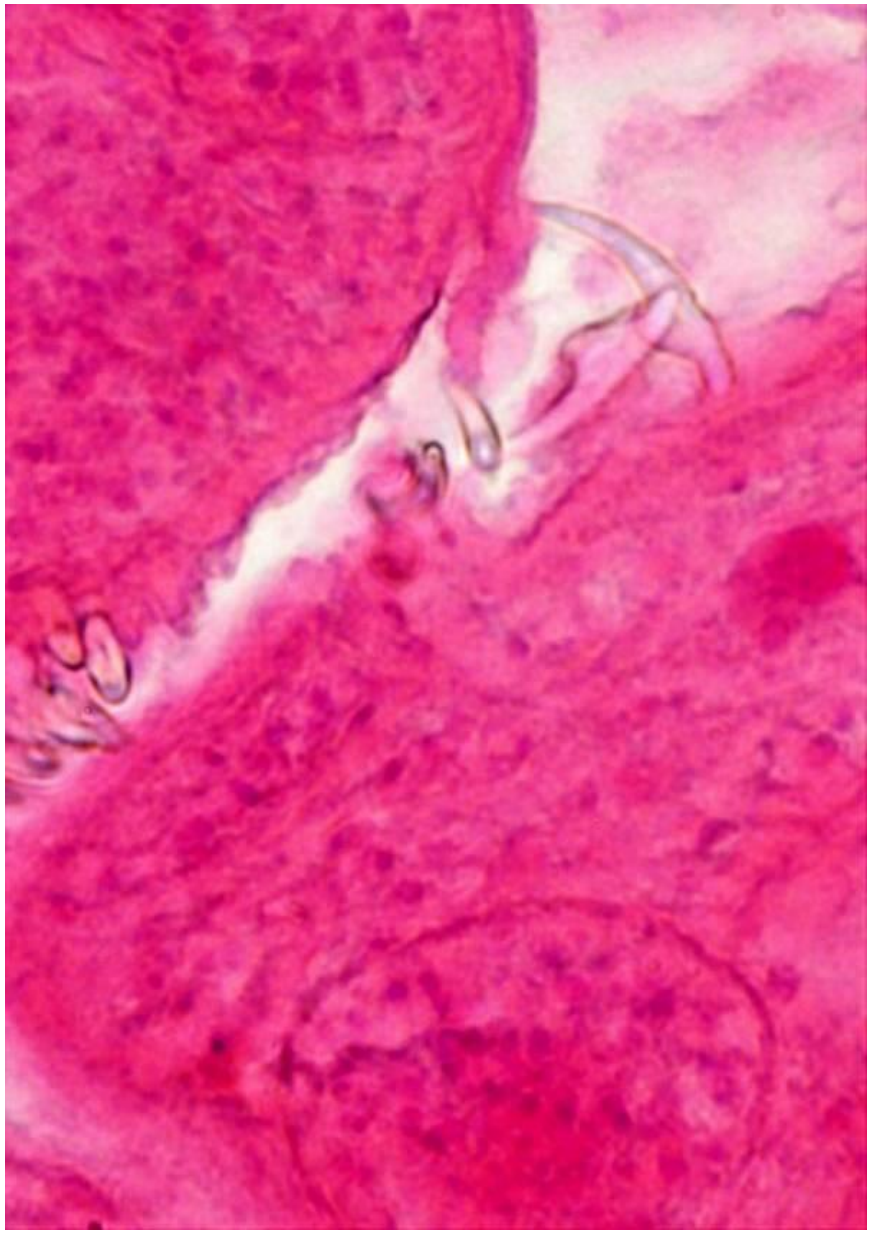

FN PLZEN Bory
SOMATOM Emotion
VA10E
H-SP-CR
A
15-MAR-2003
15-MAR-2003
13:56:56.77
TP -265.0
IMA 24
SPI 3
Di 1 12.5
An 1 47
Di 2 8.9
An 2 142
R
mA 100
TI 1.00
SL 8.0/12.0
-16/-35
B40s
v.s.plichi
101S620
300 80ML I.V.
W 1000
C -700
W 300
C 0

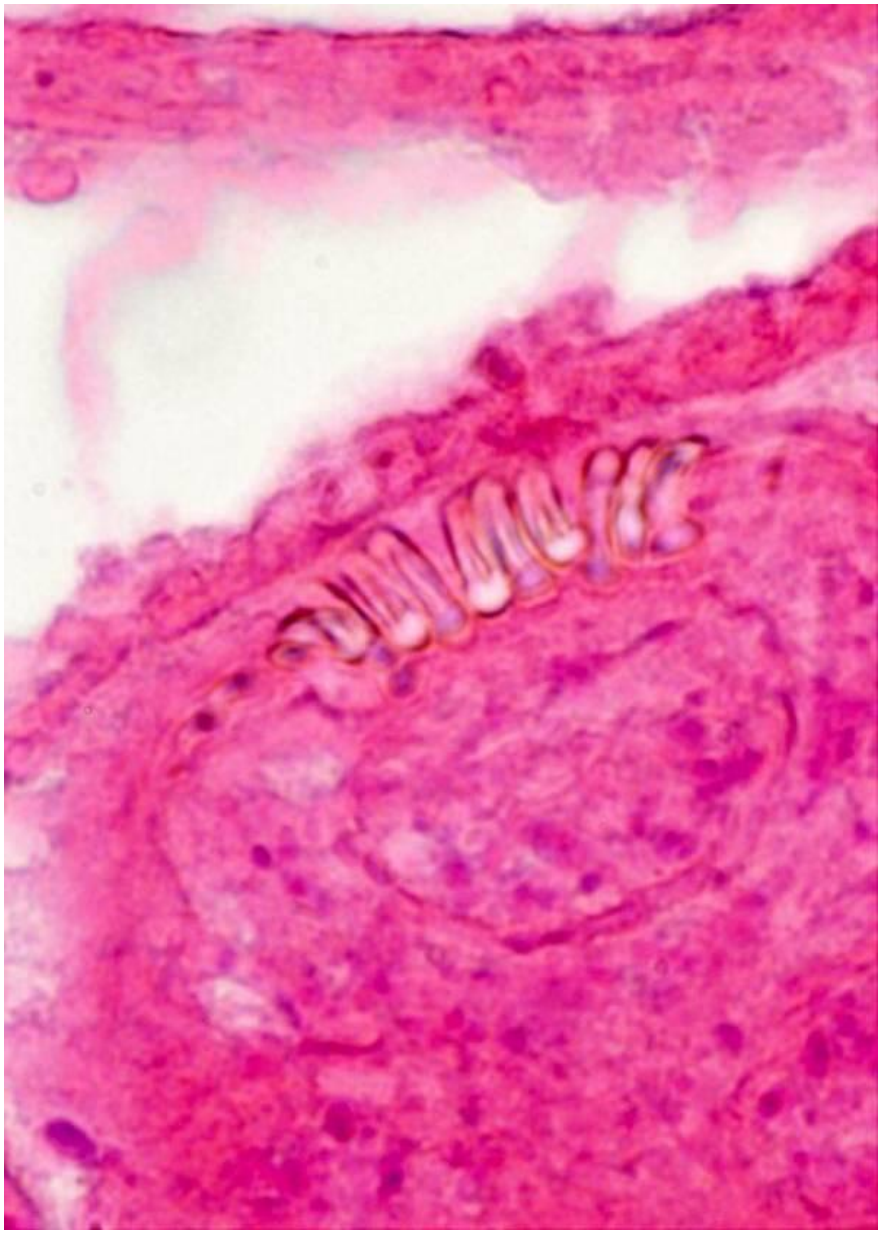
BAL



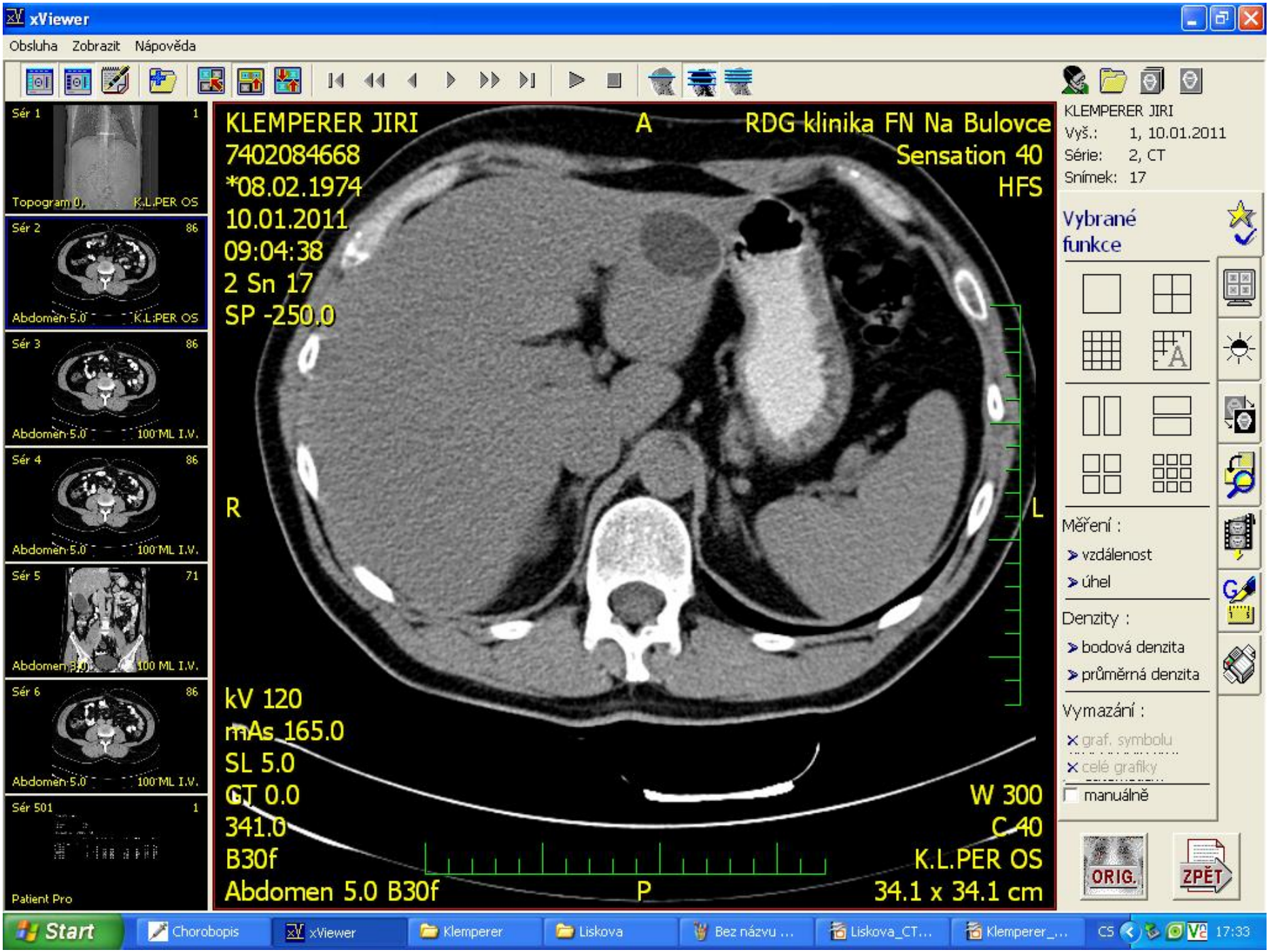
LUNG HYDATID CYST

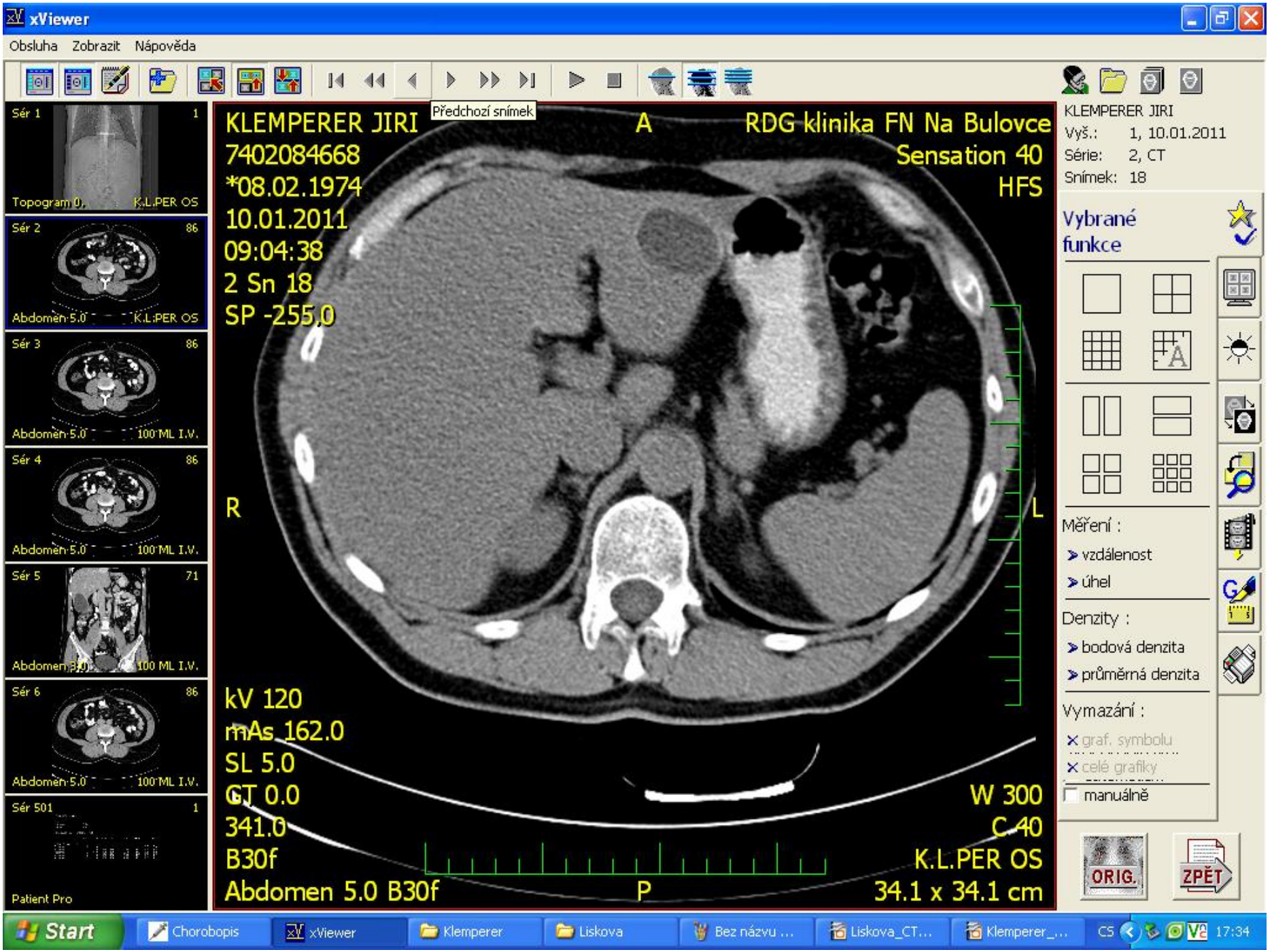
Microskopy H&E

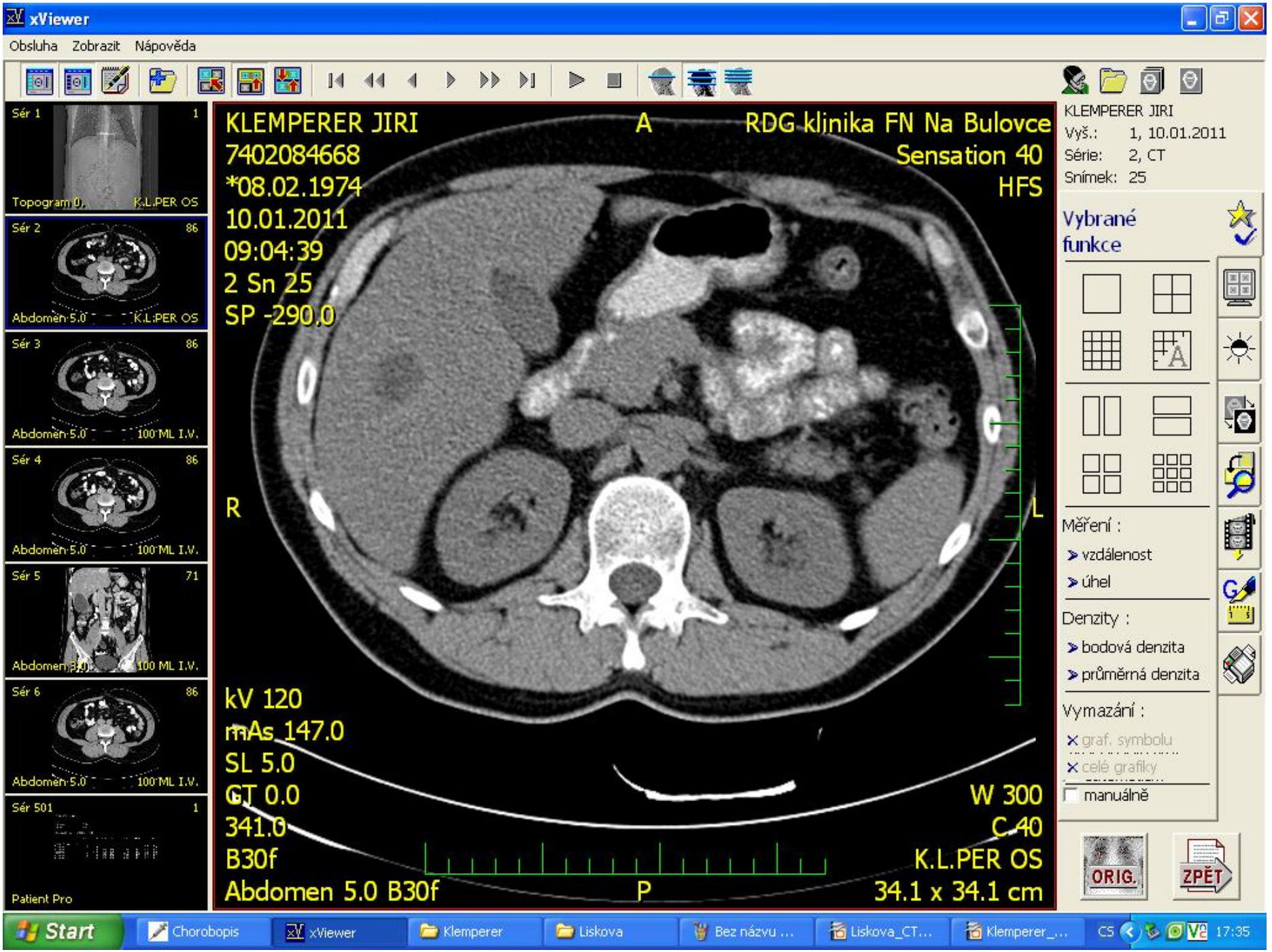


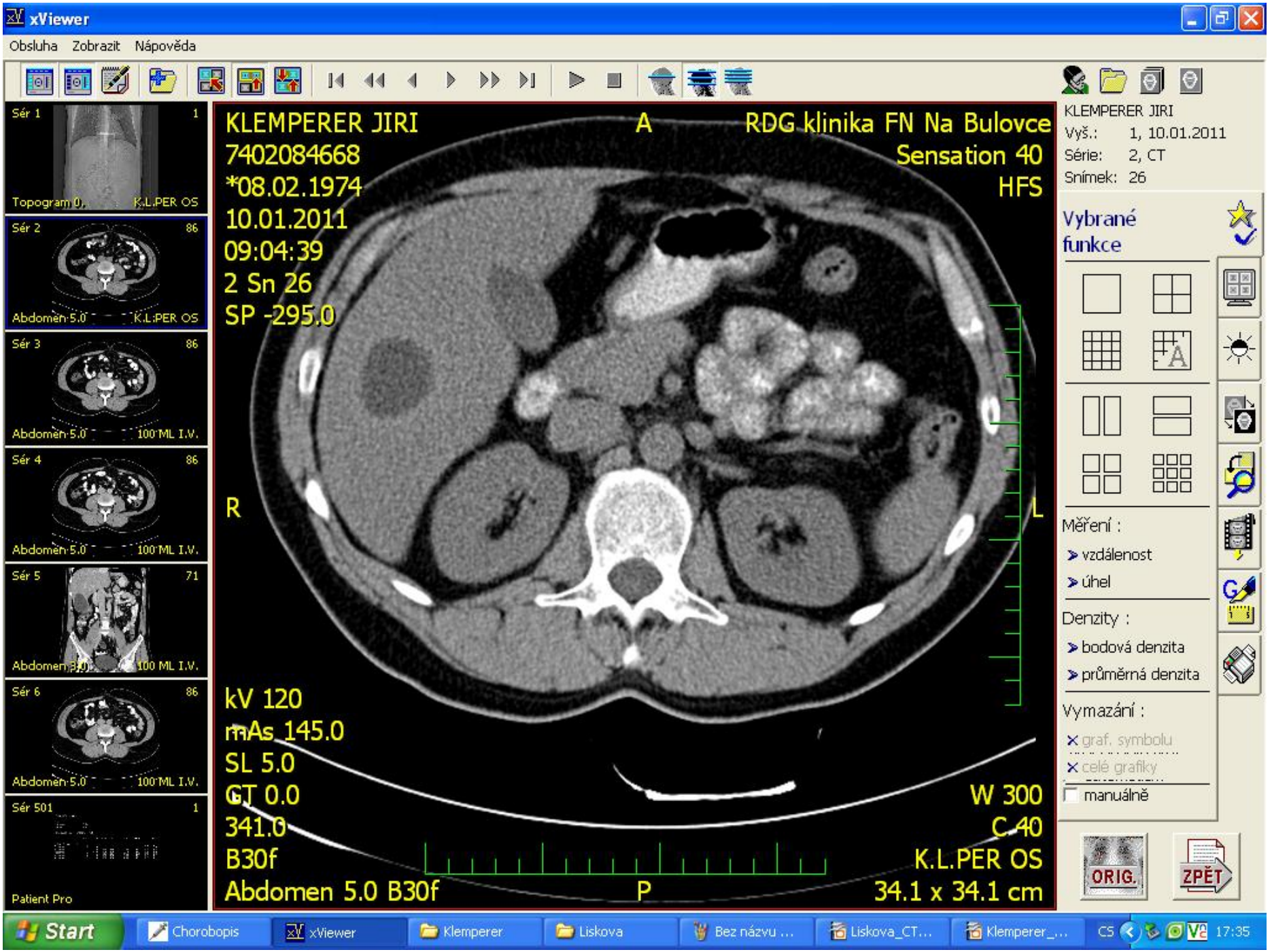


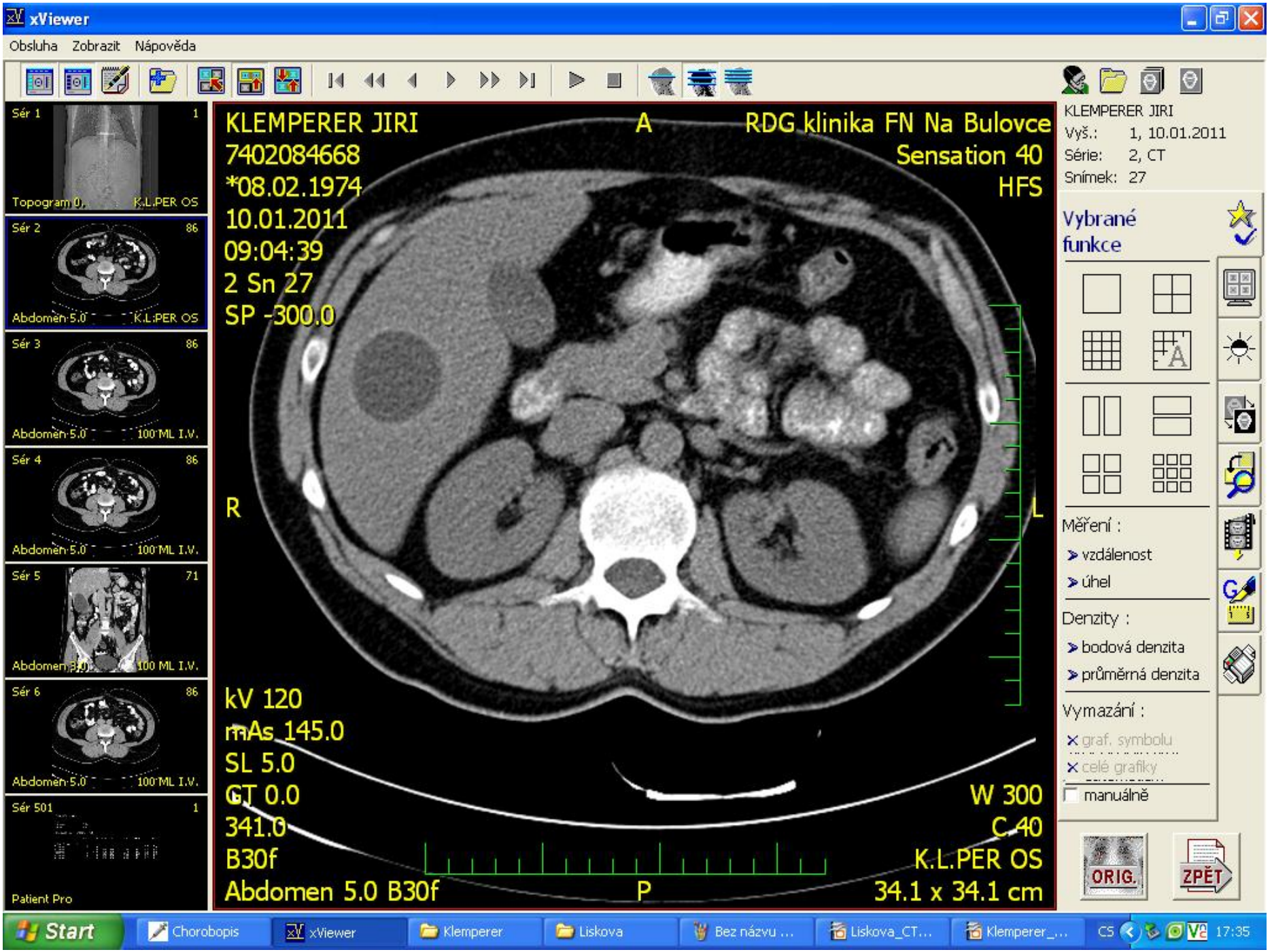
Case V

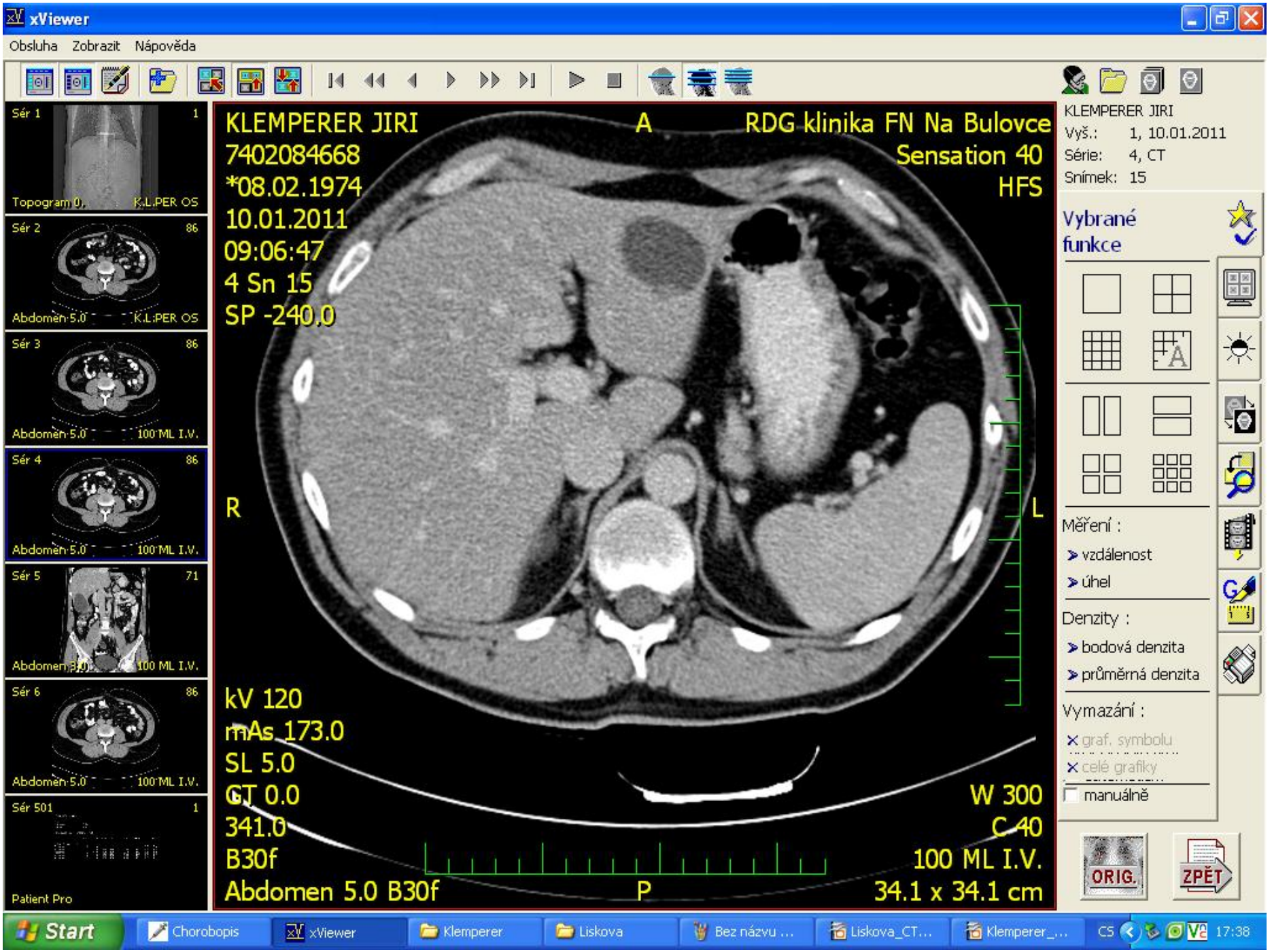

xViewer
Obsluha Zobrazit Nápověda
Sér 1 1
Topogram 0, K.L.PER OS
Sér 2 86
Abdomen 5.0 K.L.PER OS
Sér 3 86
Abdomen 5.0 100 ML I.V.
Sér 4 86
Abdomen 5.0 100 ML I.V.
Sér 5 71
Abdomen 5.0 100 ML I.V.
Sér 6 86
Abdomen 5.0 100 ML I.V.
Sér 501 1
Patient Pro
KLEMPERER JIRI
7402084668
*08.02.1974
10.01.2011
09:04:38
2 Sn 17
SP -250.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 165.0
SL 5.0
GT 0.0
341.0
B30f
Abdomen 5.0 B30f
P
W 300
C 40
K.L.PER OS
34.1 x 34.1 cm
KLEMPERER JIRI
Vyš.: 1, 10.01.2011
Série: 2, CT
Snímek: 17
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
Klemperer
Liskova
Bez názvu ...
Liskova_CT...
Klemperer_...
CS
17:33

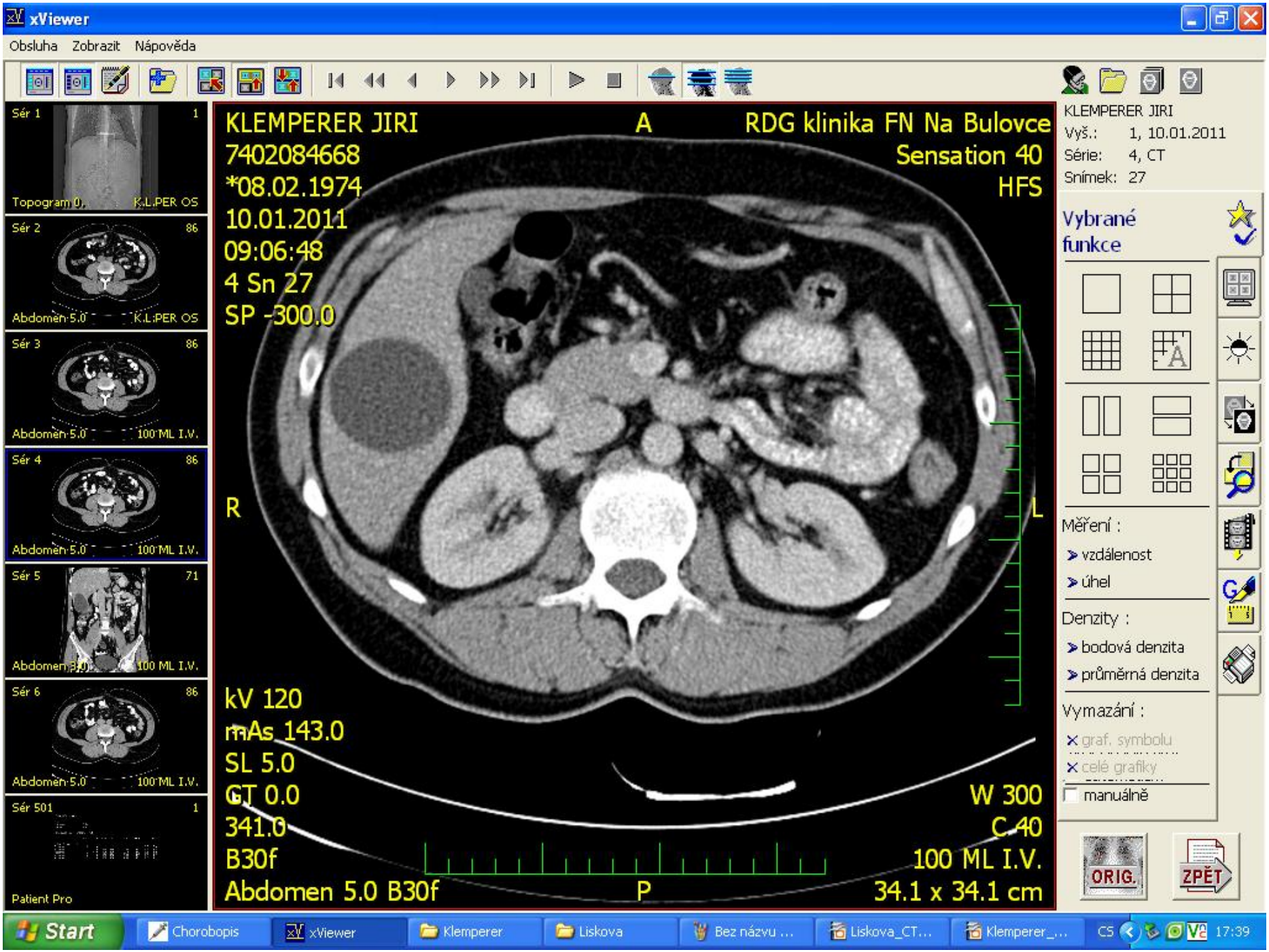

xViewer
Obsluha Zobrazit Nápověda
Předchozí snímek
Sér 1 1
Topogram 0, K.L.PER OS
Sér 2 86
Abdomen 5.0 K.L.PER OS
Sér 3 86
Abdomen 5.0 100 ML I.V.
Sér 4 86
Abdomen 5.0 100 ML I.V.
Sér 5 71
Abdomen 5.0 100 ML I.V.
Sér 6 86
Abdomen 5.0 100 ML I.V.
Sér 501 1
Patient Pro
KLEMPERER JIRI
7402084668
*08.02.1974
10.01.2011
09:04:38
2 Sn 18
SP -255.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 162.0
SL 5.0
GT 0.0
341.0
B30f
Abdomen 5.0 B30f
P
W 300
C 40
K.L.PER OS
34.1 x 34.1 cm
KLEMPERER JIRI
Vyš.: 1, 10.01.2011
Série: 2, CT
Snímek: 18
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
Klemperer
Liskova
Bez názvu ...
Liskova_CT...
Klemperer_...
CS
17:34

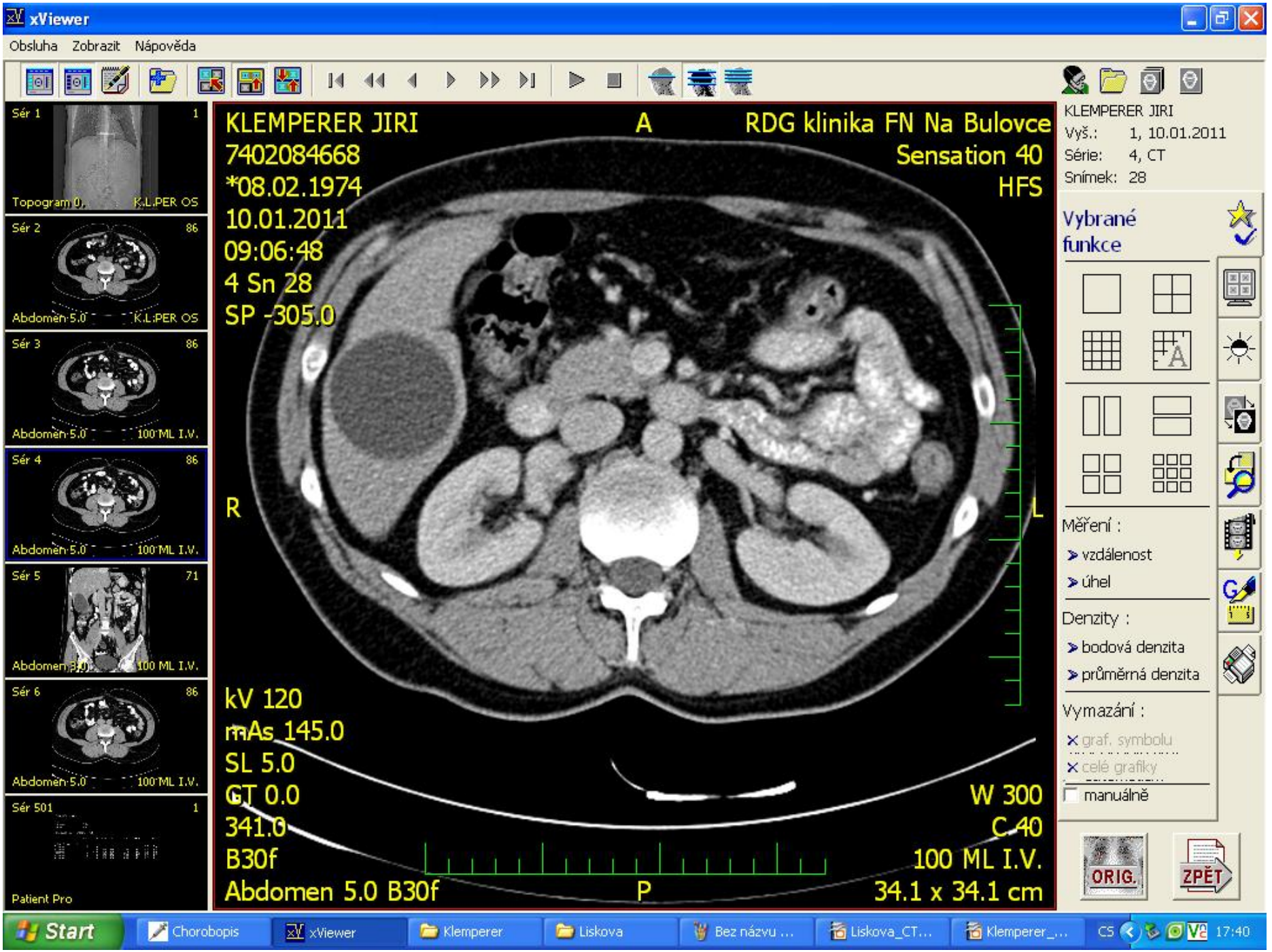

xViewer
Obsluha Zobrazit Nápověda
Sér 1 1
Topogram 0, K.L.PER OS
Sér 2 86
Abdomen 5.0 K.L.PER OS
Sér 3 86
Abdomen 5.0 100 ML I.V.
Sér 4 86
Abdomen 5.0 100 ML I.V.
Sér 5 71
Abdomen 5.0 100 ML I.V.
Sér 6 86
Abdomen 5.0 100 ML I.V.
Sér 501 1
Patient Pro
KLEMPERER JIRI
7402084668
*08.02.1974
10.01.2011
09:04:39
2 Sn 25
SP -290.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 147.0
SL 5.0
GT 0.0
341.0
B30f
Abdomen 5.0 B30f
P
W 300
C 40
K.L.PER OS
34.1 x 34.1 cm
KLEMPERER JIRI
Vyš.: 1, 10.01.2011
Série: 2, CT
Snímek: 25
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
Klemperer
Liskova
Bez názvu ...
Liskova_CT...
Klemperer_...
CS
17:35

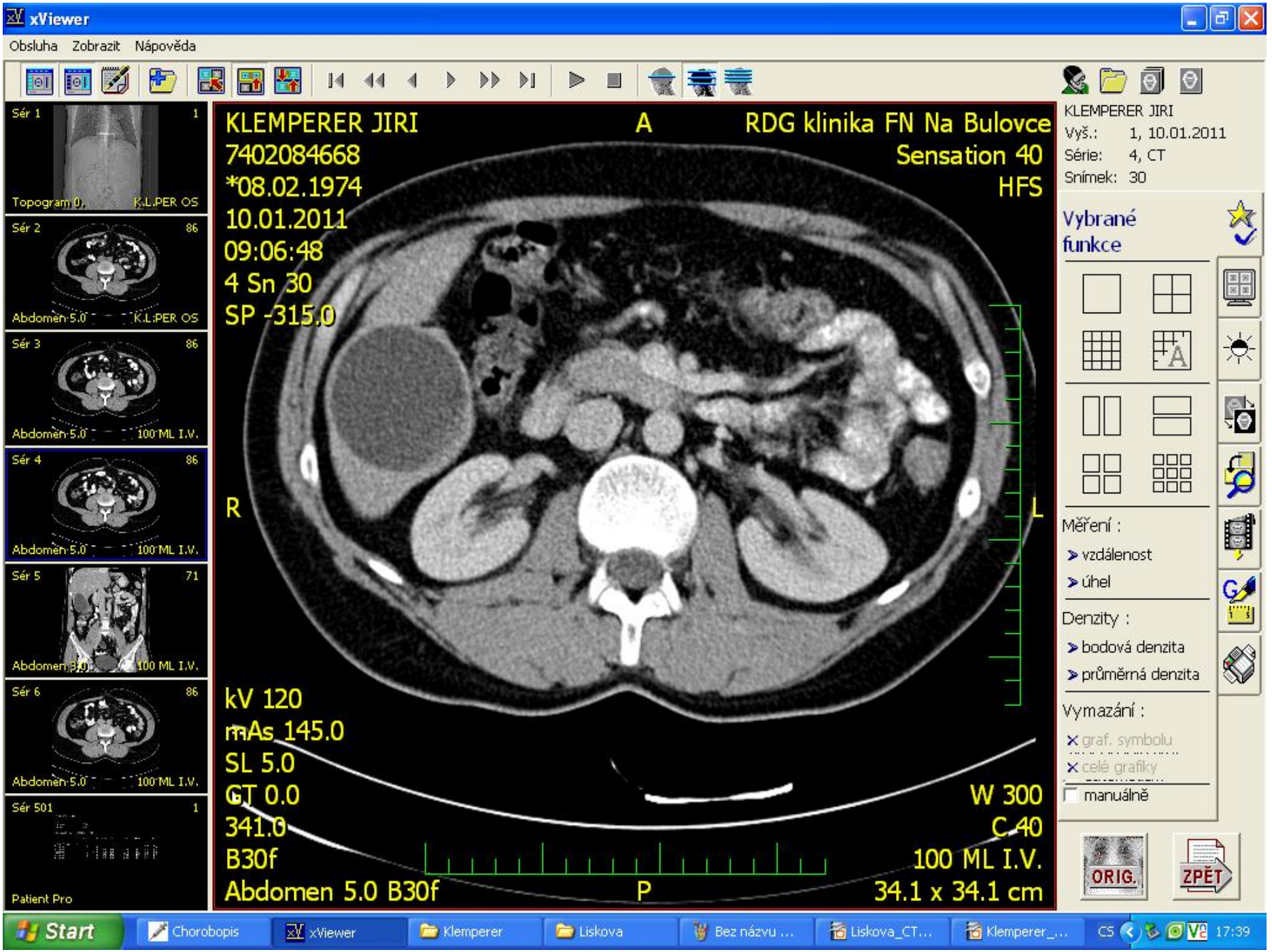

xViewer
Obsluha Zobrazit Nápověda
Sér 1 1
Topogram 0, K.L.PER OS
Sér 2 86
Abdomen 5.0 K.L.PER OS
Sér 3 86
Abdomen 5.0 100 ML I.V.
Sér 4 86
Abdomen 5.0 100 ML I.V.
Sér 5 71
Abdomen 5.0 100 ML I.V.
Sér 6 86
Abdomen 5.0 100 ML I.V.
Sér 501 1
Patient Pro
KLEMPERER JIRI
7402084668
*08.02.1974
10.01.2011
09:04:39
2 Sn 26
SP -295.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 145.0
SL 5.0
GT 0.0
341.0
B30f
Abdomen 5.0 B30f
P
W 300
C 40
K.L.PER OS
34.1 x 34.1 cm
KLEMPERER JIRI
Vyš.: 1, 10.01.2011
Série: 2, CT
Snímek: 26
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
Klemperer
Liskova
Bez názvu ...
Liskova_CT...
Klemperer_...
CS
17:35

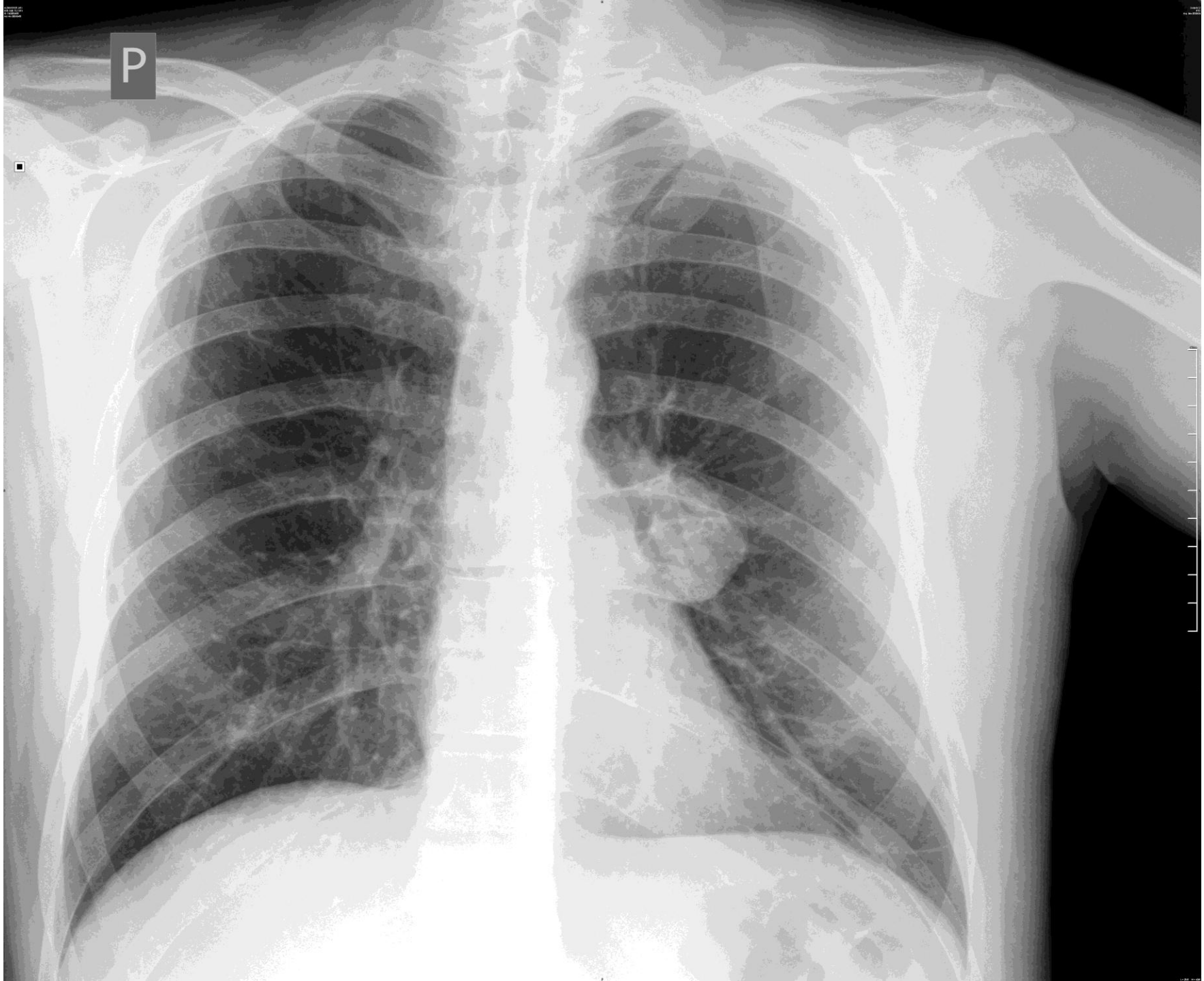

xViewer
Obsluha Zobrazit Nápověda
Sér 1 1
Topogram 0, K.L.PER OS
Sér 2 86
Abdomen 5.0 K.L.PER OS
Sér 3 86
Abdomen 5.0 100 ML I.V.
Sér 4 86
Abdomen 5.0 100 ML I.V.
Sér 5 71
Abdomen 5.0 100 ML I.V.
Sér 6 86
Abdomen 5.0 100 ML I.V.
Sér 501 1
Patient Pro
KLEMPERER JIRI
7402084668
*08.02.1974
10.01.2011
09:04:39
2 Sn 27
SP -300.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 145.0
SL 5.0
GT 0.0
341.0
B30f
Abdomen 5.0 B30f
P
W 300
C 40
K.L.PER OS
34.1 x 34.1 cm
KLEMPERER JIRI
Vyš.: 1, 10.01.2011
Série: 2, CT
Snímek: 27
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
Klemperer
Liskova
Bez názvu ...
Liskova_CT...
Klemperer_...
CS
17:35


xViewer
Obsluha Zobrazit Nápověda
Sér 1 1
Topogram 0, K.L.PER OS
Sér 2 86
Abdomen 5.0 K.L.PER OS
Sér 3 86
Abdomen 5.0 100 ML I.V.
Sér 4 86
Abdomen 5.0 100 ML I.V.
Sér 5 71
Abdomen 5.0 100 ML I.V.
Sér 6 86
Abdomen 5.0 100 ML I.V.
Sér 501 1
Patient Pro
KLEMPERER JIRI
7402084668
*08.02.1974
10.01.2011
09:06:47
4 Sn 15
SP -240.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 173.0
SL 5.0
GT 0.0
341.0
B30f
Abdomen 5.0 B30f
P
W 300
C 40
100 ML I.V.
34.1 x 34.1 cm
KLEMPERER JIRI
Vyš.: 1, 10.01.2011
Série: 4, CT
Snímek: 15
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
Klemperer
Liskova
Bez názvu ...
Liskova_CT...
Klemperer_...
CS
17:38


xViewer
Obsluha Zobrazit Nápověda
Sér 1 1
Topogram 0, K.L.PER OS
Sér 2 86
Abdomen 5.0 K.L.PER OS
Sér 3 86
Abdomen 5.0 100 ML I.V.
Sér 4 86
Abdomen 5.0 100 ML I.V.
Sér 5 71
Abdomen 5.0 100 ML I.V.
Sér 6 86
Abdomen 5.0 100 ML I.V.
Sér 501 1
Patient Pro
KLEMPERER JIRI
7402084668
*08.02.1974
10.01.2011
09:06:48
4 Sn 27
SP -300.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 143.0
SL 5.0
GT 0.0
341.0
B30f
Abdomen 5.0 B30f
P
W 300
C 40
100 ML I.V.
34.1 x 34.1 cm
KLEMPERER JIRI
Vyš.: 1, 10.01.2011
Série: 4, CT
Snímek: 27
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
Klemperer
Liskova
Bez názvu ...
Liskova_CT...
Klemperer_...
CS
17:39


xViewer
Obsluha Zobrazit Nápověda
Sér 1 1
Topogram 0, K.L.PER OS
Sér 2 86
Abdomen 5.0 K.L.PER OS
Sér 3 86
Abdomen 5.0 100 ML I.V.
Sér 4 86
Abdomen 5.0 100 ML I.V.
Sér 5 71
Abdomen 5.0 100 ML I.V.
Sér 6 86
Abdomen 5.0 100 ML I.V.
Sér 501 1
Patient Pro
KLEMPERER JIRI
7402084668
*08.02.1974
10.01.2011
09:06:48
4 Sn 28
SP -305.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 145.0
SL 5.0
GT 0.0
341.0
B30f
Abdomen 5.0 B30f
P
W 300
C 40
100 ML I.V.
34.1 x 34.1 cm
KLEMPERER JIRI
Vyš.: 1, 10.01.2011
Série: 4, CT
Snímek: 28
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
Klemperer
Liskova
Bez názvu ...
Liskova_CT...
Klemperer_...
CS
17:40


xViewer
Obsluha Zobrazit Nápověda
Sér 1 1
Topogram 0, K.L.PER OS
Sér 2 86
Abdomen 5.0 K.L.PER OS
Sér 3 86
Abdomen 5.0 100 ML I.V.
Sér 4 86
Abdomen 5.0 100 ML I.V.
Sér 5 71
Abdomen 5.0 100 ML I.V.
Sér 6 86
Abdomen 5.0 100 ML I.V.
Sér 501 1
Patient Pro
KLEMPERER JIRI
7402084668
*08.02.1974
10.01.2011
09:06:48
4 Sn 30
SP -315.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 145.0
SL 5.0
GT 0.0
341.0
B30f
Abdomen 5.0 B30f
P
W 300
C 40
100 ML I.V.
34.1 x 34.1 cm
KLEMPERER JIRI
Vyš.: 1, 10.01.2011
Série: 4, CT
Snímek: 30
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
Klemperer
Liskova
Bez názvu ...
Liskova_CT...
Klemperer_...
CS
17:39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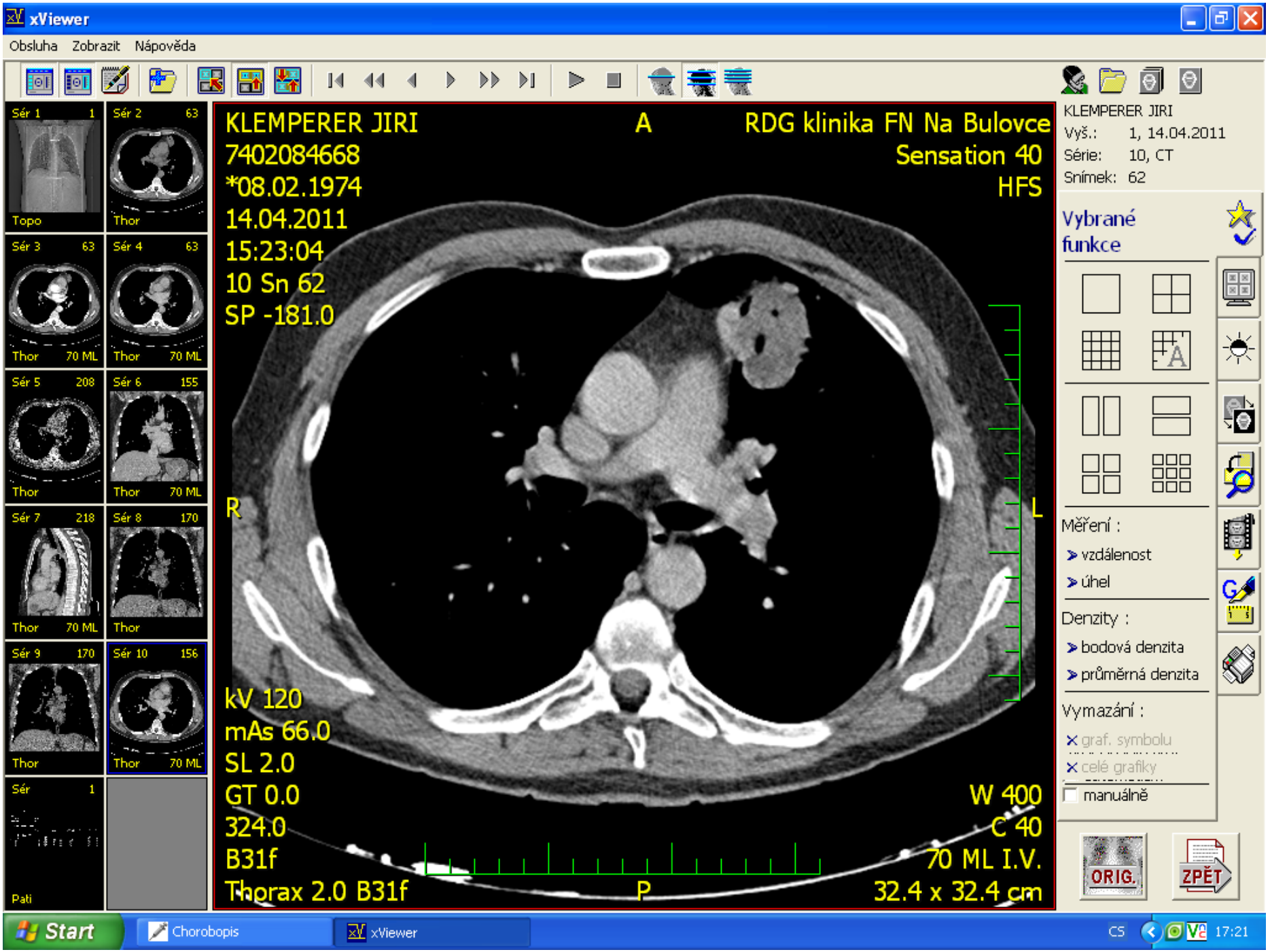
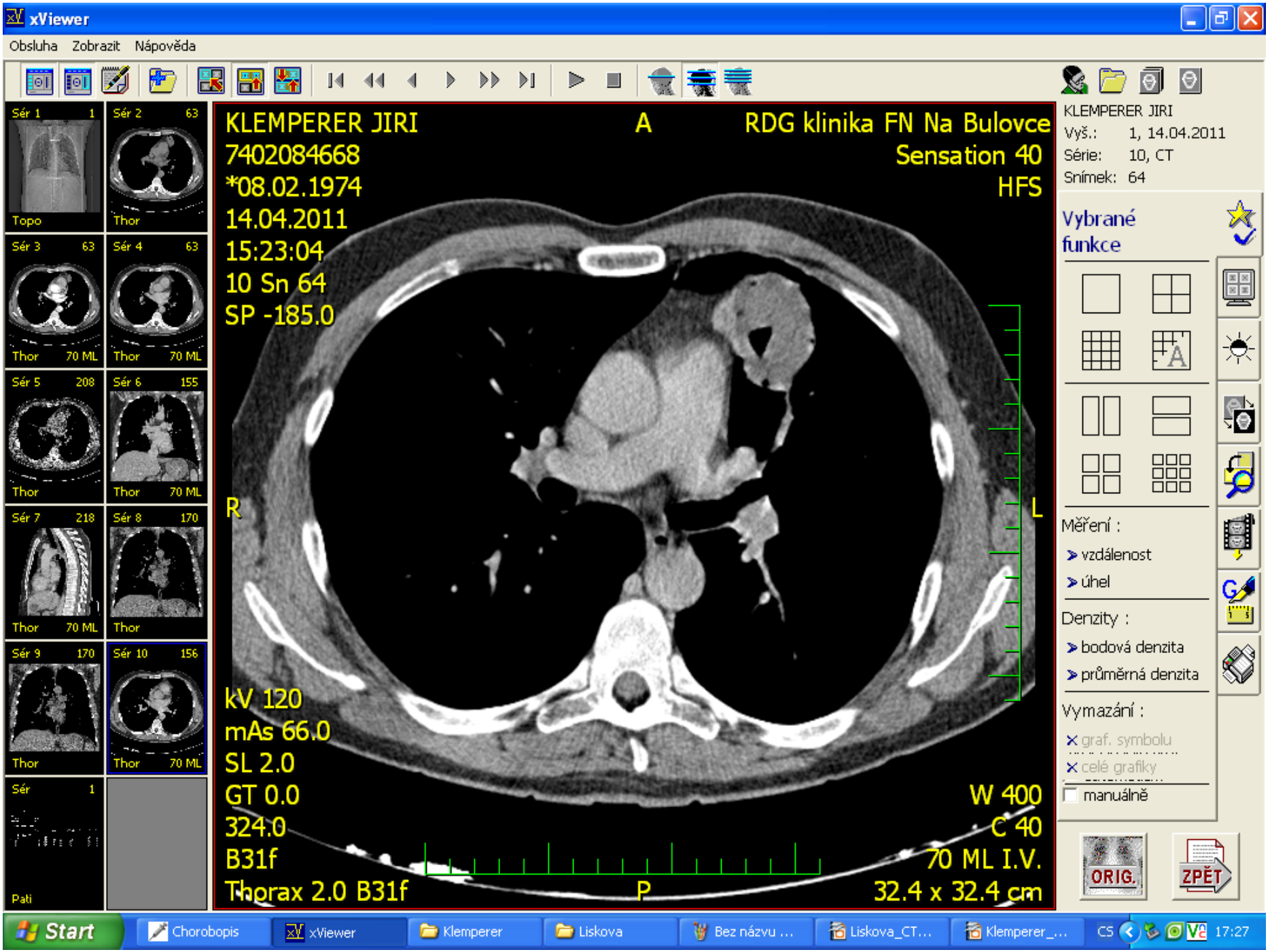
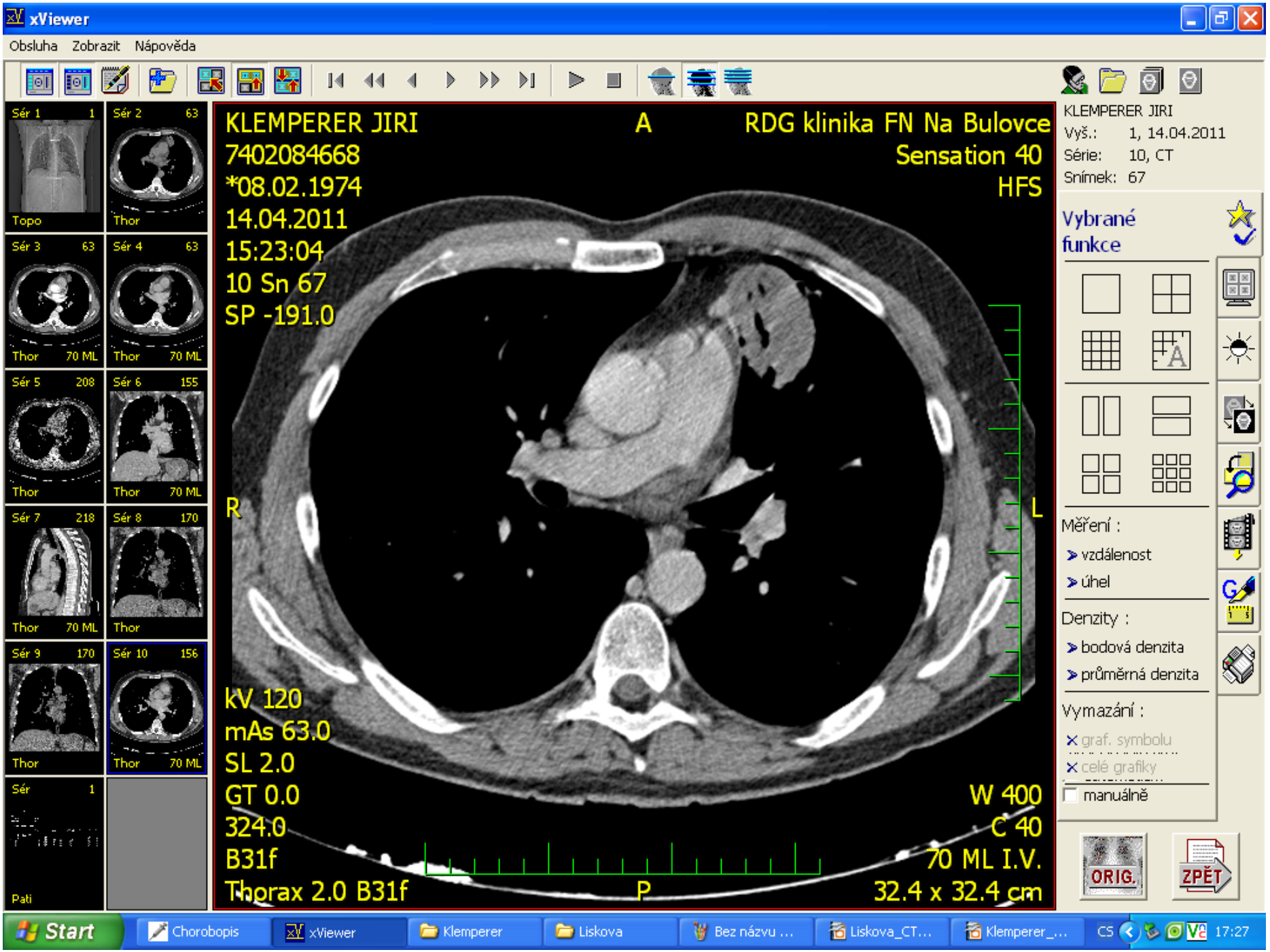

xViewer
Obsluha Zobrazit Nápověda
Sér 1 1
Topo
Sér 2 63
Thor
Sér 3 63
Thor 70 ML
Sér 4 63
Thor 70 ML
Sér 5 208
Thor
Sér 6 155
Thor 70 ML
Sér 7 218
Thor 70 ML
Sér 8 170
Thor
Sér 9 170
Thor
Sér 10 156
Thor 70 ML
Sér 1
Pati
KLEMPERER JIRI
7402084668
*08.02.1974
14.04.2011
15:23:04
10 Sn 62
SP -181.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 66.0
SL 2.0
GT 0.0
324.0
B31f
Thorax 2.0 B31f
P
W 400
C 40
70 ML I.V.
32.4 x 32.4 cm
KLEMPERER JIRI
Vyš.: 1, 14.04.2011
Série: 10, CT
Snímek: 62
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
CS
17:21


xViewer
Obsluha Zobrazit Nápověda
Sér 1 1
Topo
Sér 2 63
Thor
Sér 3 63
Thor 70 ML
Sér 4 63
Thor 70 ML
Sér 5 208
Thor
Sér 6 155
Thor 70 ML
Sér 7 218
Thor 70 ML
Sér 8 170
Thor
Sér 9 170
Thor
Sér 10 156
Thor 70 ML
Sér 1
Pati
KLEMPERER JIRI
7402084668
*08.02.1974
14.04.2011
15:23:04
10 Sn 64
SP -185.0
A
RDG klinika FN Na Bulovce
Sensation 40
HFS
R
L
kV 120
mAs 66.0
SL 2.0
GT 0.0
324.0
B31f
Thorax 2.0 B31f
P
W 400
C 40
70 ML I.V.
32.4 x 32.4 cm
KLEMPERER JIRI
Vyš.: 1, 14.04.2011
Série: 10, CT
Snímek: 64
Vybrané funkce
Měření :
vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
Vymazání :
graf. symbolu
celé grafiky
manuálně
ORIG.
ZPĚT
Start
Chorobopis
xViewer
Klemperer
Liskova
Bez názvu ...
Liskova_CT...
Klemperer_...
CS
17:27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Sér 3 63 Thor 70 ML
Sér 4 63 Thor 70 ML
Sér 5 208 Thor
Sér 6 155 Thor 70 ML
Sér 7 218 Thor 70 ML
Sér 8 170 Thor
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Sér 1 Pati
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Thorax 2.0 B31f
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C 40
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Série: 10, CT
Snímek: 67
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vzdálenost
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Denzity :
bodová denzita
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Vymazání :
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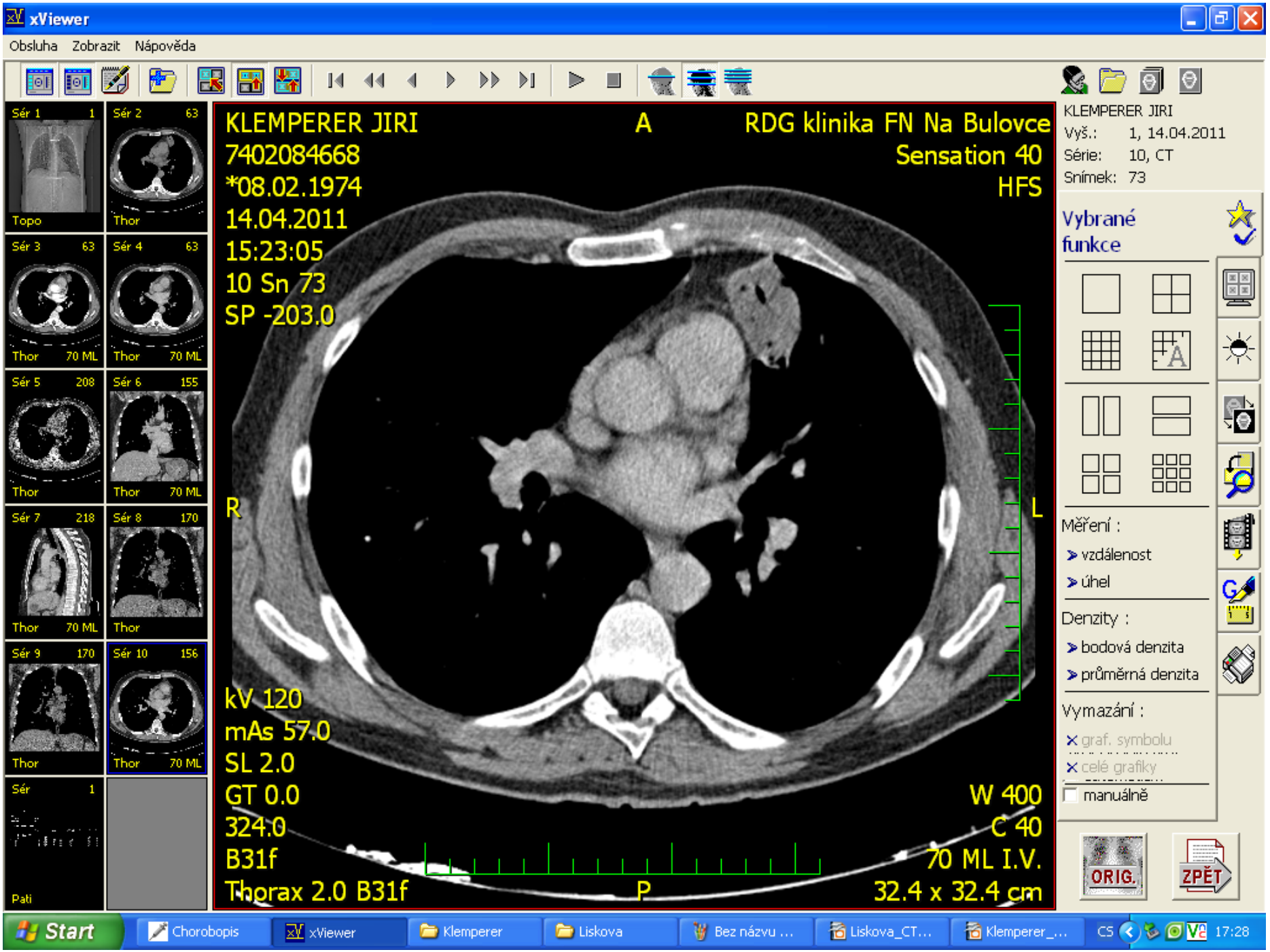
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Sér 4 63 Thor 70 ML
Sér 5 208 Thor
Sér 6 155 Thor 70 ML
Sér 7 218 Thor 70 ML
Sér 8 170 Thor
Sér 9 170 Thor
Sér 10 156 Thor 70 ML
Sér 1 Pati
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B31f
Thorax 2.0 B31f
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W 400
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KLEMPERER JIRI
Vyš.: 1, 14.04.2011
Série: 10, CT
Snímek: 73
Vybrané funkce
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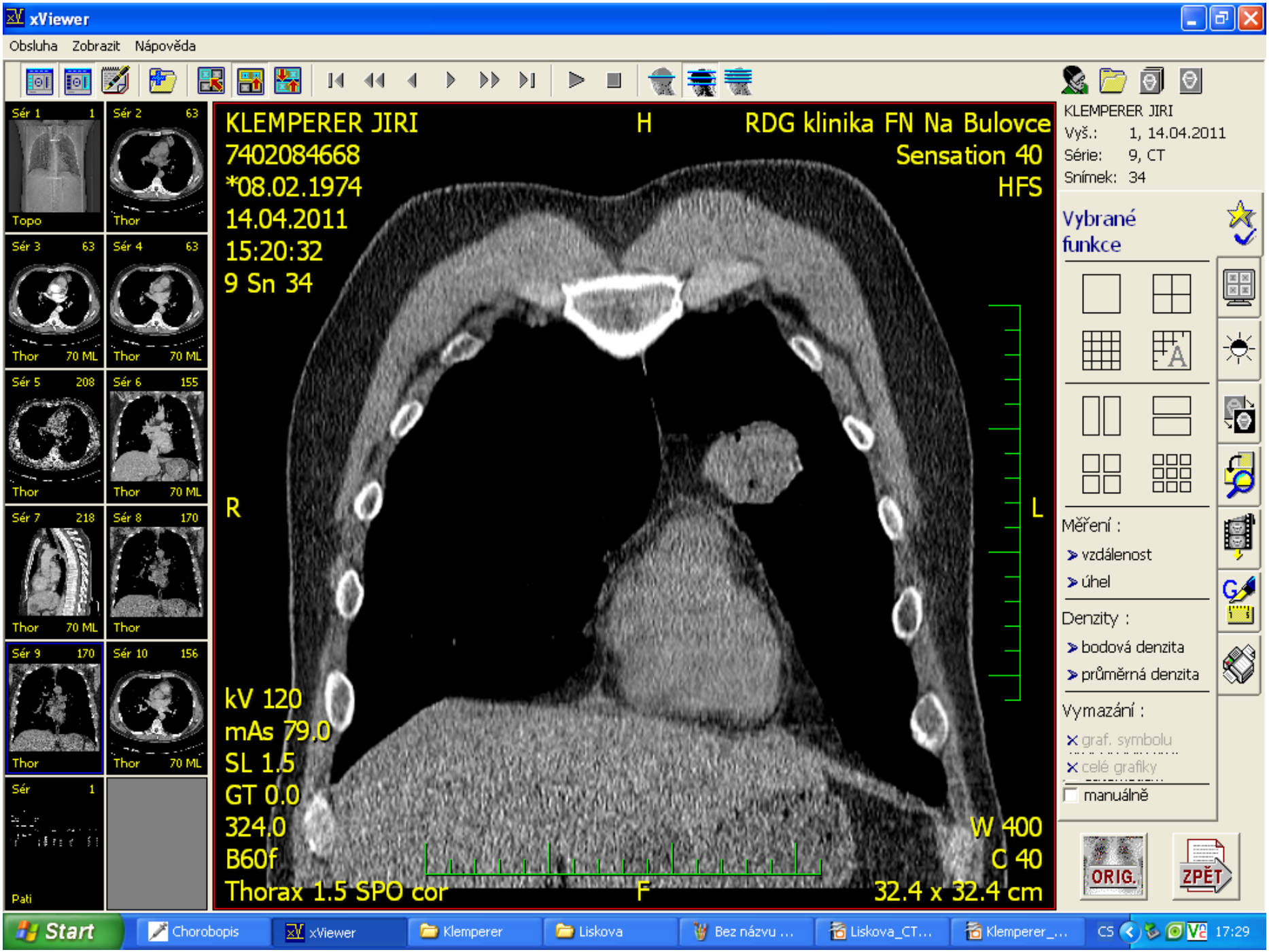
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Sér 8 170 Thor
Sér 9 170 Thor
Sér 10 156 Thor 70 ML
Sér 1 Pati
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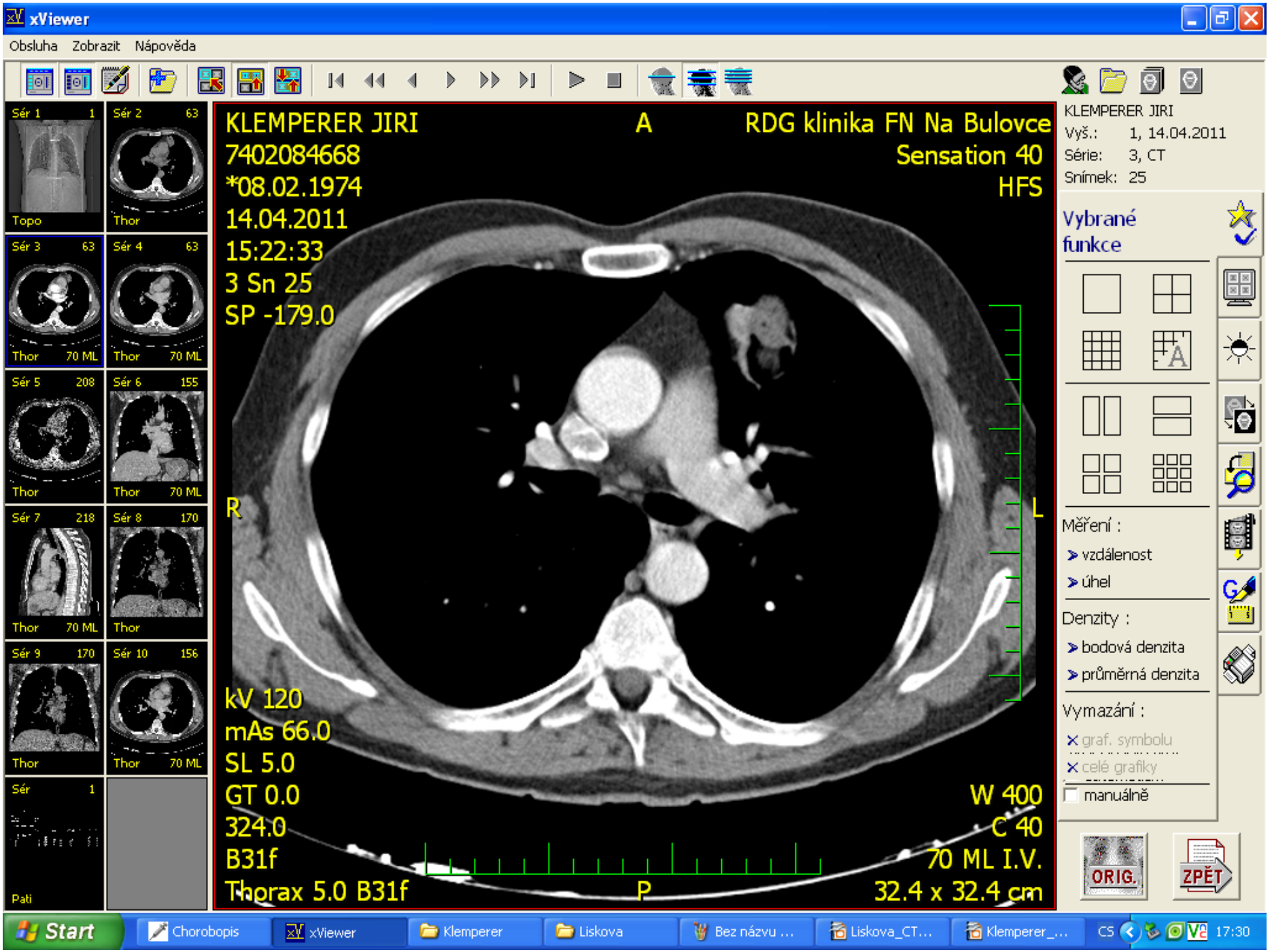
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Sér 3 63
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Sér 5 208
Thor
Sér 6 155
Thor 70 ML
Sér 7 218
Thor 70 ML
Sér 8 170
Thor
Sér 9 170
Thor
Sér 10 156
Thor 70 ML
Sér 1
Pati
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7402084668
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14.04.2011
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kV 120
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GT 0.0
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Thorax 5.0 B31f
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W 400
C 40
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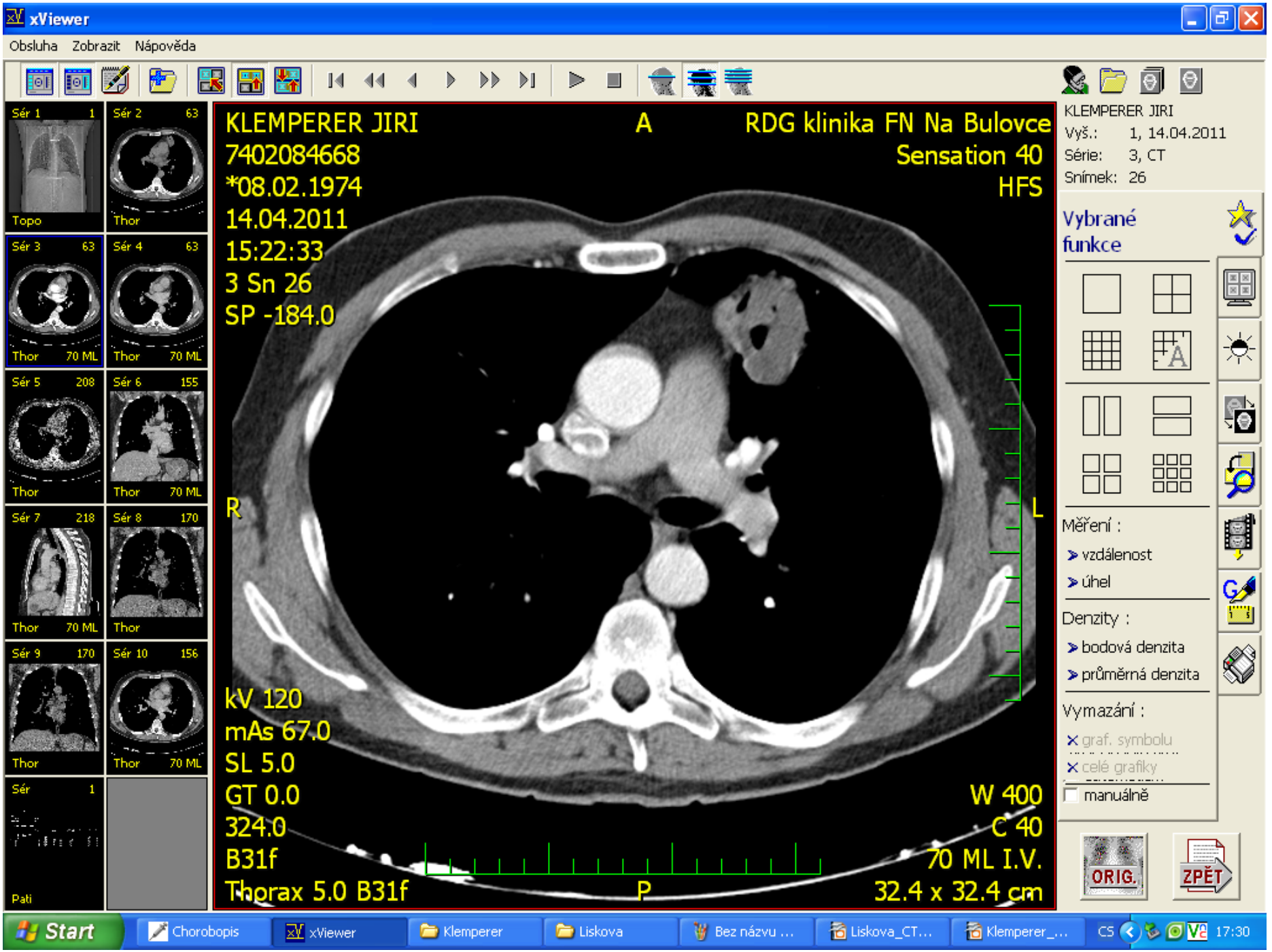
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Snímek: 26
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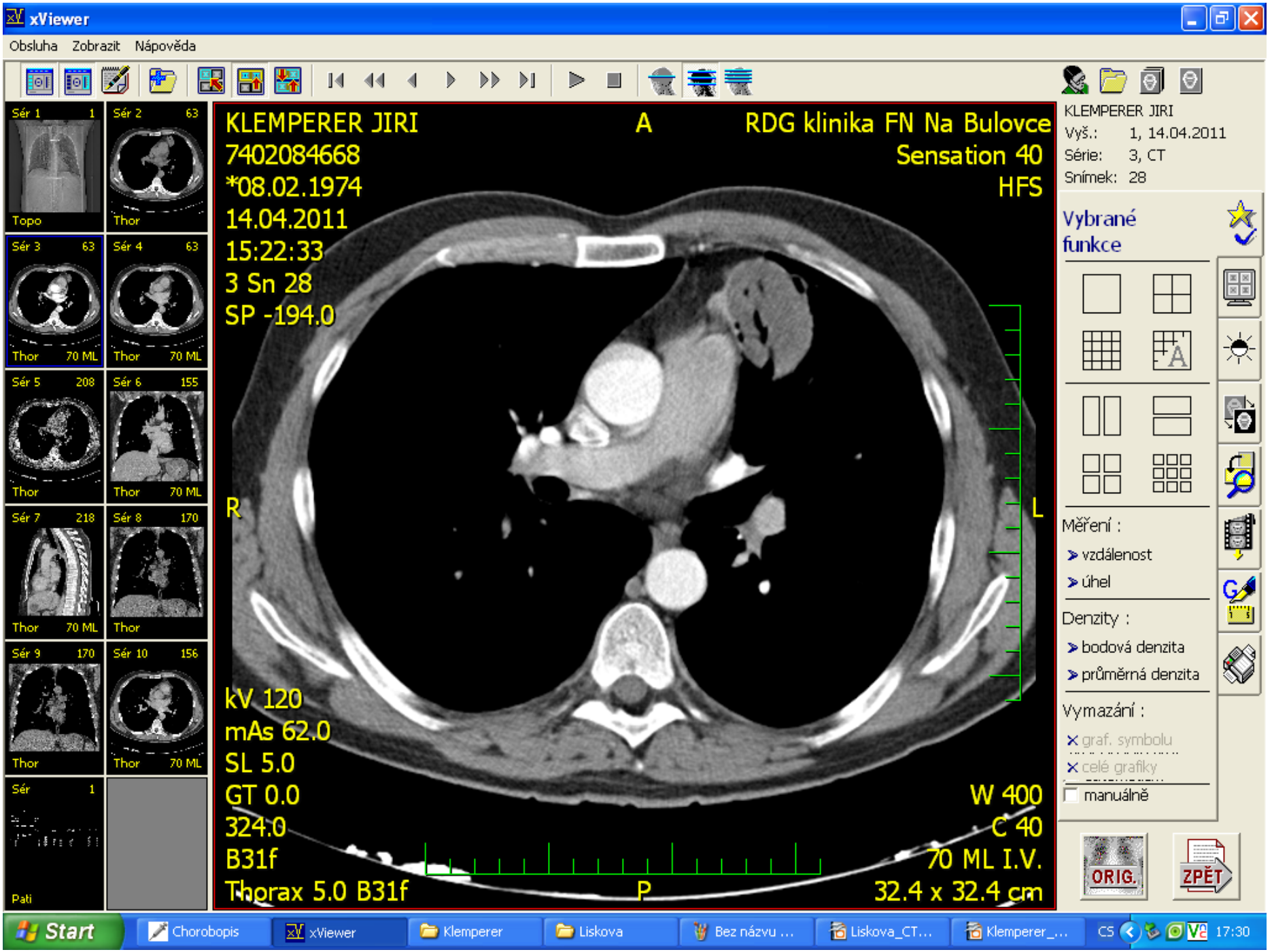
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Thor
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Thor 70 ML
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Sér 5 208
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Sér 6 155
Thor 70 ML
Sér 7 218
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Sér 9 170
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32.4 x 32.4 cm
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Série: 3, CT
Snímek: 28
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vzdálenost
úhel
Denzity :
bodová denzita
průměrná denzita
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Bez názvu ...
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Klemperer_...
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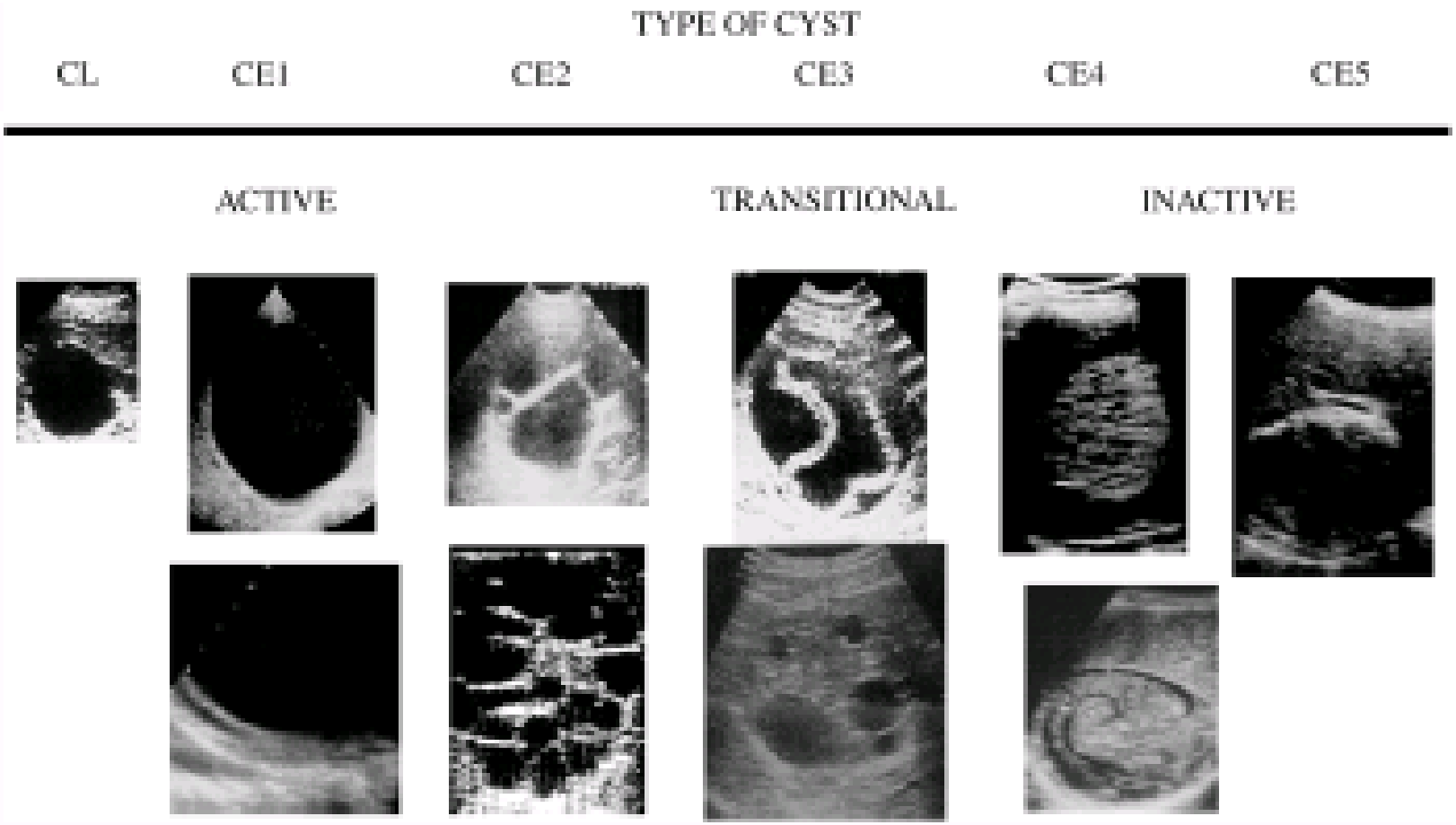
DIAGNOSTICS OF HYDATIDOSIS

- CT, US, X-ray
- SerologY (IHA, IFR, ELISA)
- PCR

Diagnostical punction is not recommended:

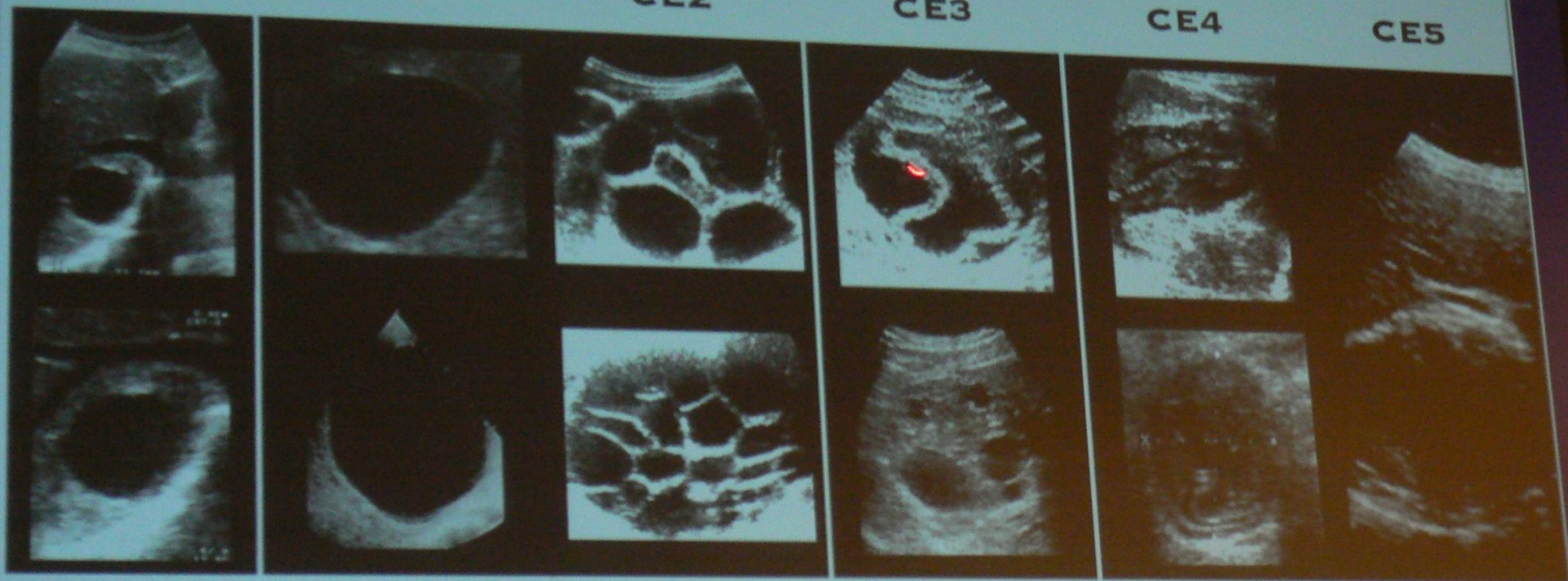
anaphylacsis

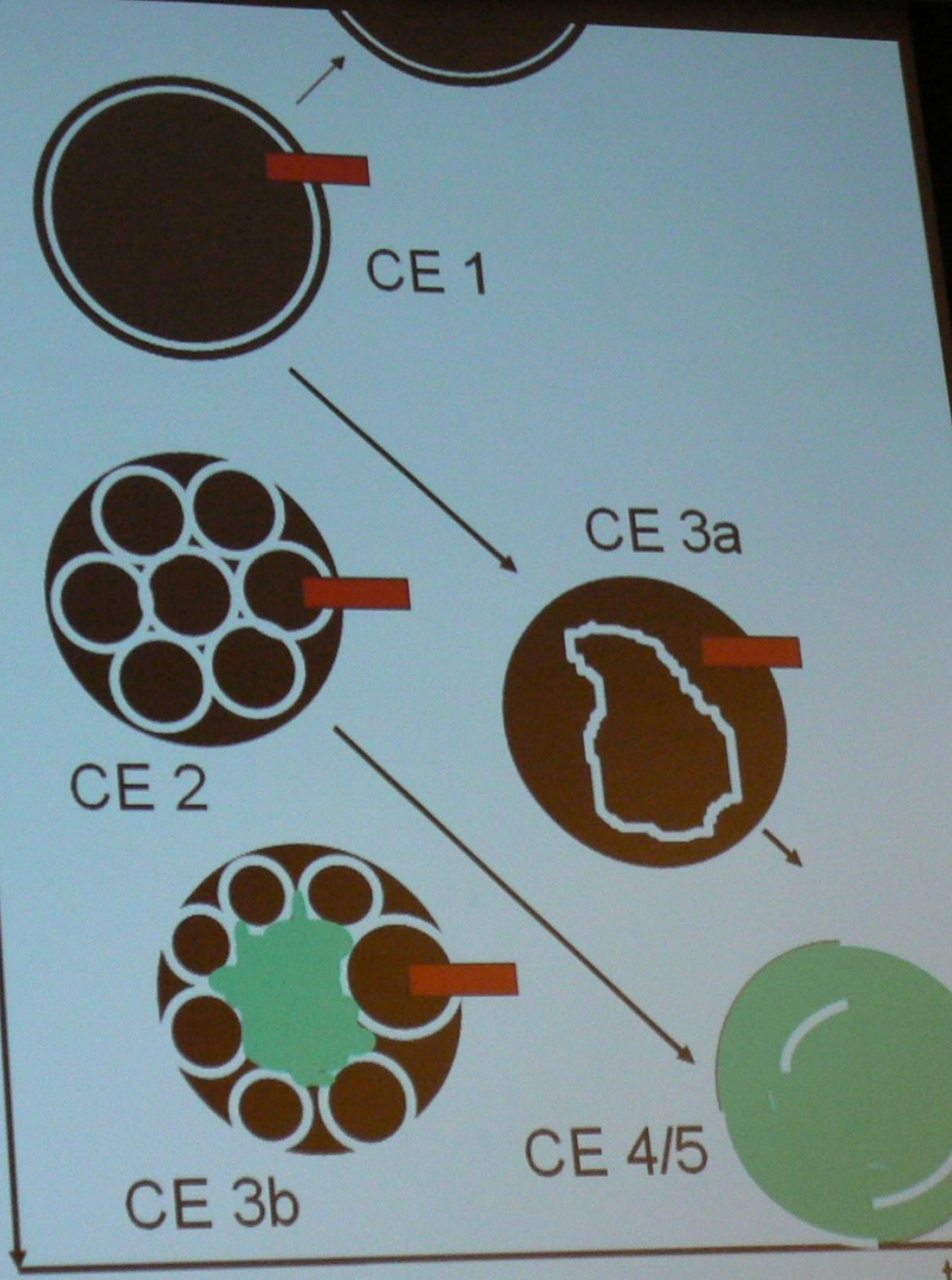
secondary dissemination

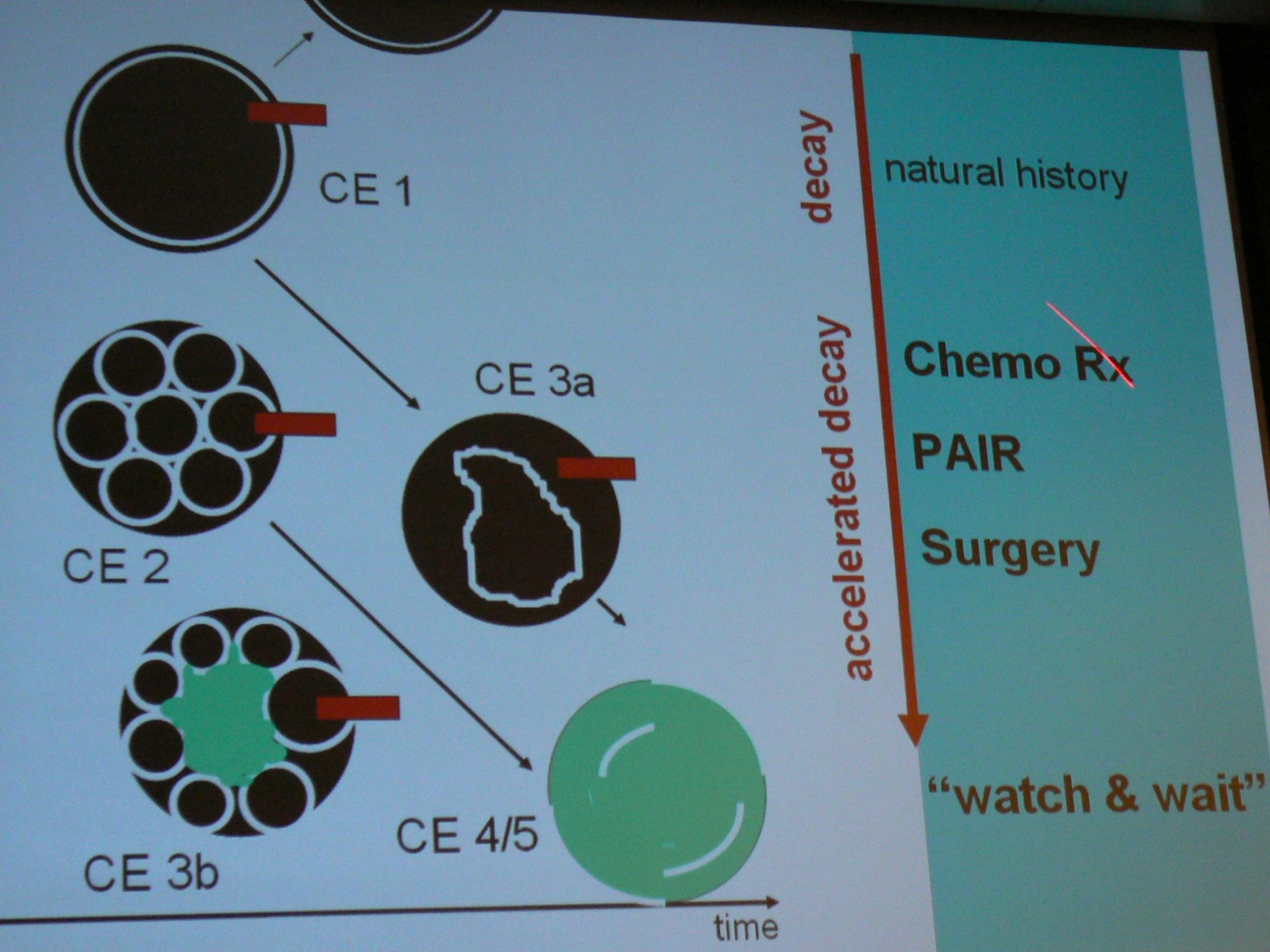


Management of cystic hydatid disease caused by Echinococcus granulosus should be based on viability of the parasite, which can be estimated from radiographic appearance. The ultrasound appearance includes lesions classified as active, transitional, and inactive. **Active cysts** include types CL (with a cystic lesion and no visible cyst wall), CE1 [with a visible cyst wall and internal echoes (snowflake sign)], and CE2 (with a visible cyst wall and internal septation). **Transitional cysts** (CE3) may have detached laminar membranes or may be partially collapsed. **Inactive cysts** include types CE4 (a nonhomogeneous mass) and CE5 (a cyst with a thick calcified wall).

WHO-IWGE Classification of Ultrasound Images of Cystic Echinococcosis Cysts




CE 1
CE 2
CE 3a
CE 3b
CE 4/5


CE 1
CE 2
CE 3a
CE 3b
CE 4/5
time
decay
accelerated decay
natural history
Chemo Rx
PAIR
Surgery
"watch & wait"

TREATMENT

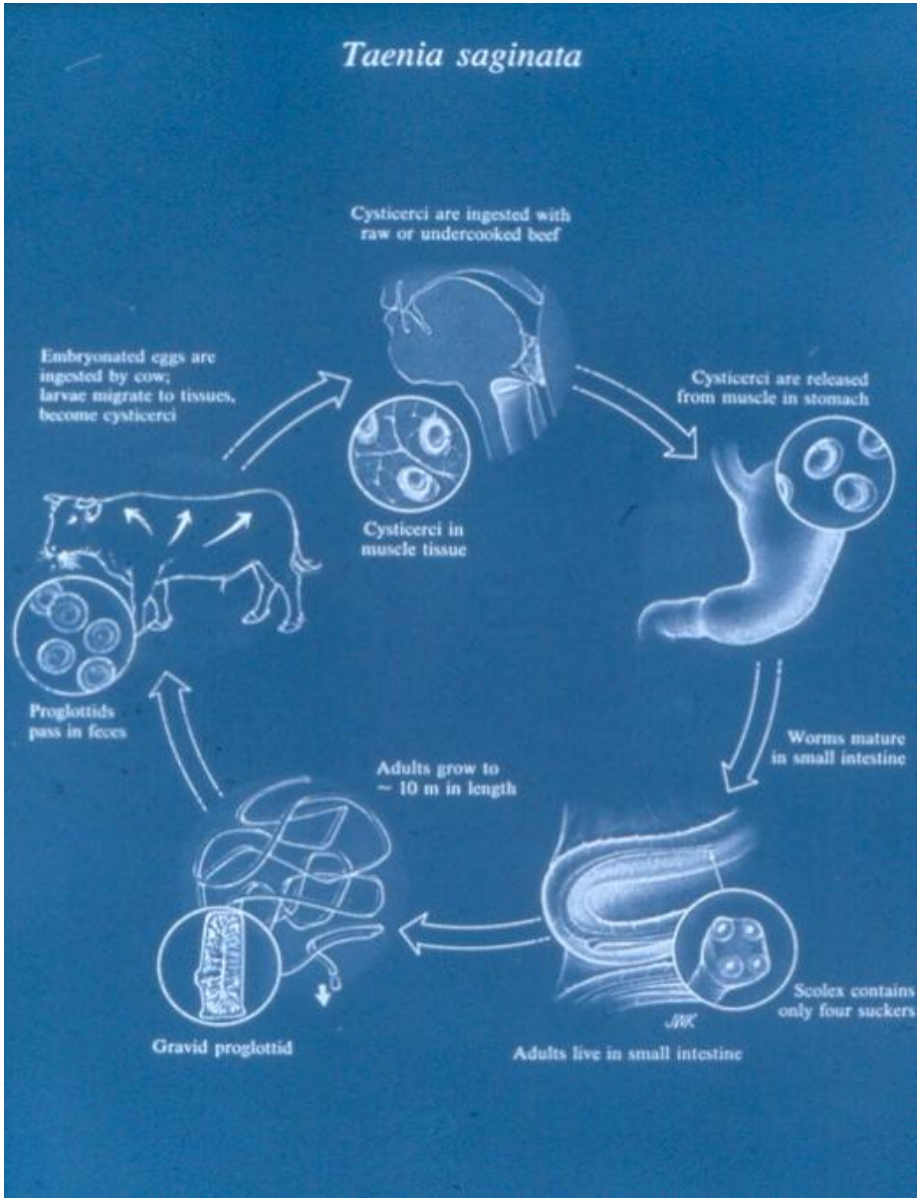
- Therapy for cystic echinococcosis is based on considerations of the size, location, and manifestations of cysts and the overall health of the patient.
- Surgery has traditionally been the principal definitive method of treatment.
- Currently, ultrasound staging is recommended for E. granulosus infections.
- For uncomplicated CE1 lesions and for some CE2 and CE3 lesions:

  PAIR (percutaneous aspiration, infusion of scolicidal agents, and reaspiration) is recommended instead of surgery.

  For prophylaxis of secondary peritoneal echinococcosis, the administration of albendazole (15 mg/kg daily in two divided doses) should be initiated at least 4 days before the procedure and continued for at least 4 weeks afterward.

LIFE CYCLE OF *TAENIA SAGINATA*

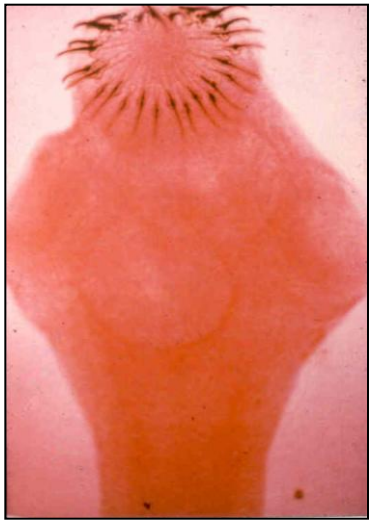
Skolex of *Teania saginata*



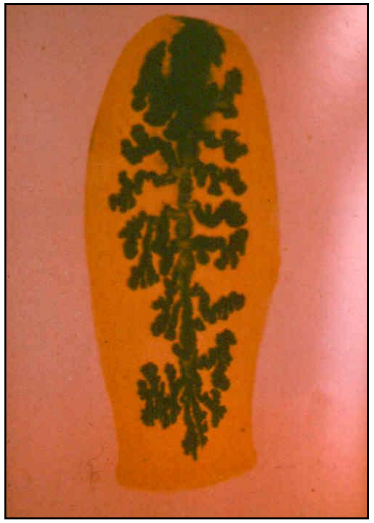
Proglotide of *T. saginata*

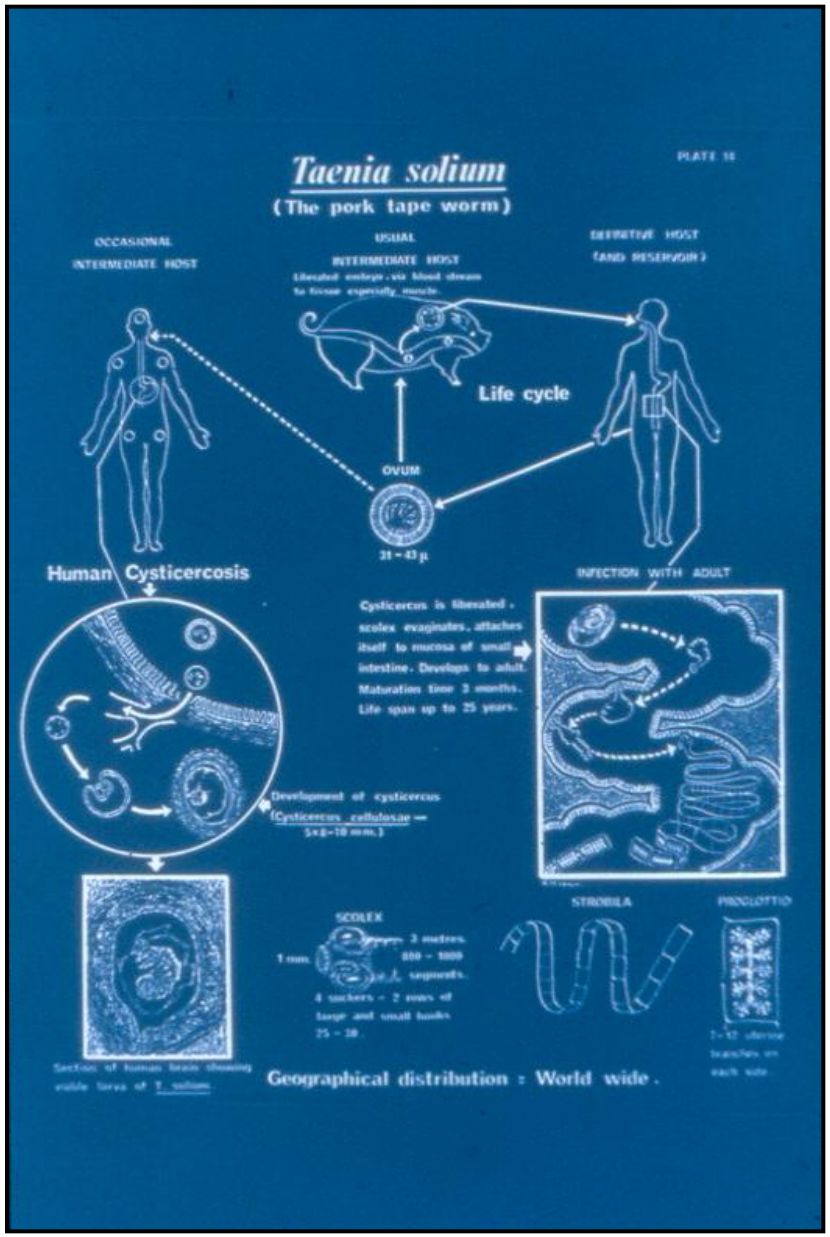
Egg of *Teania*

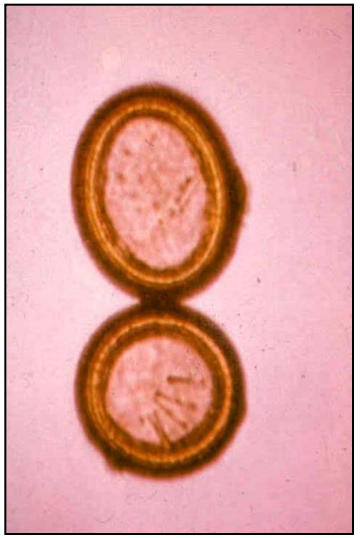
ŽIVOTNÍ CYKLUS *TAENIA SOLIUM*



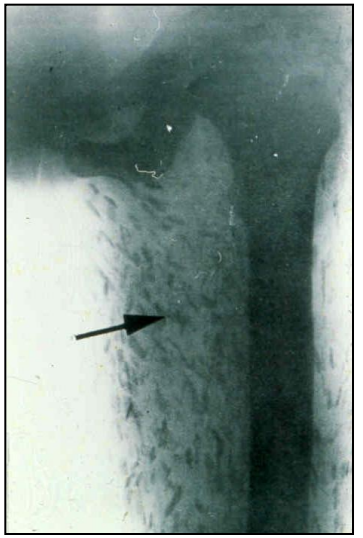
Scolex a proglotid
Taenia solium







Vajíčka *Taenia* sp.



Kalcifikované cysticerky

TAENIA SAGINATA

- The beef tapeworm *T. saginata* occurs in all countries where raw or undercooked beef is eaten.
- It is most prevalent in sub-Saharan African and Middle Eastern countries.
- Humans are the only definitive host for the adult stage of *T. saginata*, it can reach 8 m in length, inhabits the upper jejunum and has 1000 to 2000 proglottids.
- The eggs are indistinguishable from T. solium eggs measuring 30 - 40 µm.
- Eggs deposited on vegetation can live for months to years.
- When ingested by cattle the embryo – oncosphera – is released and is carried to striated muscle, where it transforms into a cysticercus.
- When ingested in raw or undercooked beef, this form can infect humans.
- After the cysticercus is ingested, it takes ~2 months for the mature adult worm to develop.

TAENIA SAGINATA

Clinical manifestations – ussually asymptomatic - patients become aware of the infection by noting passage of proglottids in their feces. They are often motile. Mild abdominal pain or discomfort, nausea, change in appetite, weakness, and weight loss can occur.

Diagnosis is made by the detection of eggs or proglottids in the stool.

- Distinguishing *T. saginata* from *T. solium* requires examination of mature proglottids or the scolex.
- Serologic tests are not helpful diagnostically.
- Light eosinophilia and elevated levels of serum IgE may be detected.
-

TREATMENT

- A single dose of **praziquantel** (10 mg/kg) is highly effective.

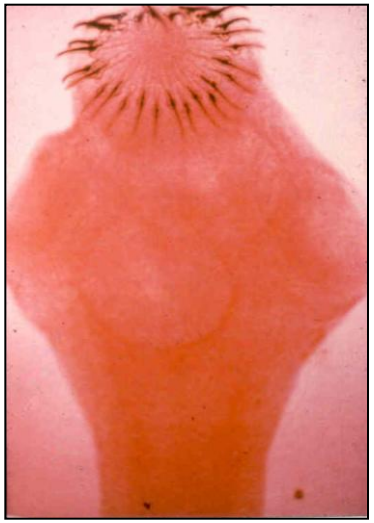
PREVENTION

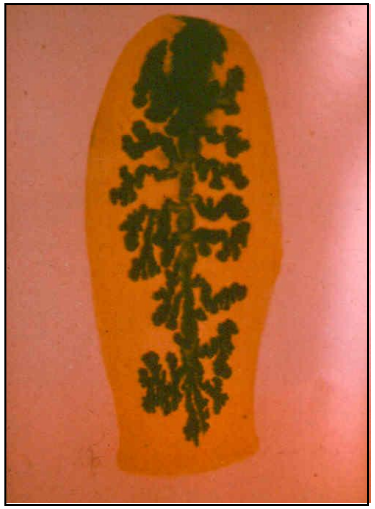
- the adequate cooking of beef; exposure to temperatures ≥ 56°C for 5 min.
- Refrigeration or salting for long periods or freezing at -10°C for 9 days.
- General prevention: inspection of beef and proper disposal of human feces.

THERAPY OF INTESTINAL CESTODOSES

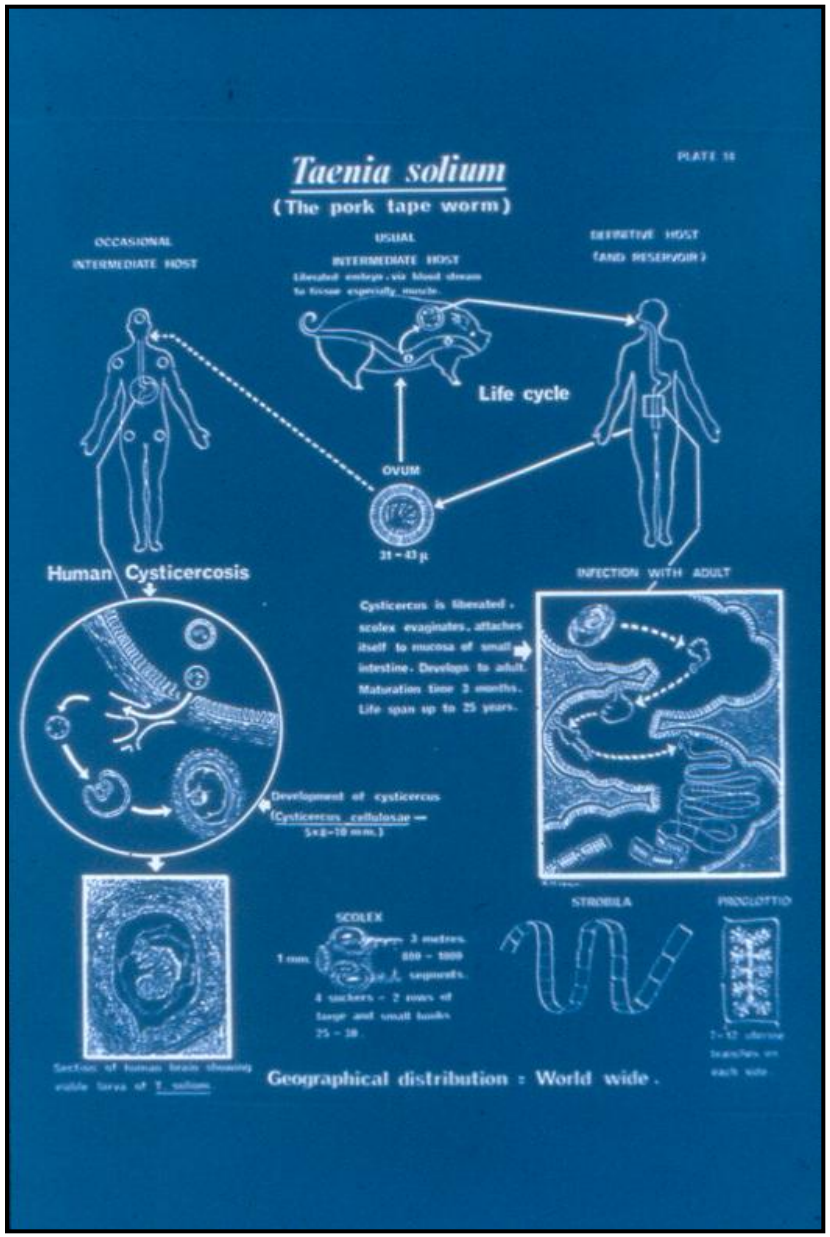
- Niclosamide (YOMESAN 500 mg)
  - 2 g p.o. in the single dose
- Praziquantel (CESOL 150 mg; BILTRICIDE 600 mg tbl.)
  - 10 mg/kg single dose
  - 25 mg/kg single dose for *Hymenolepis nana, H. diminuta*

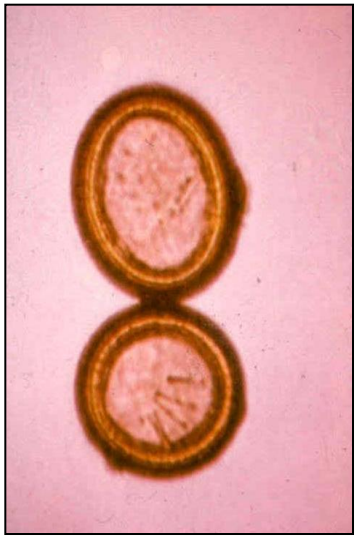
LIFE CYCLE OF *TAENIA SOLIUM*



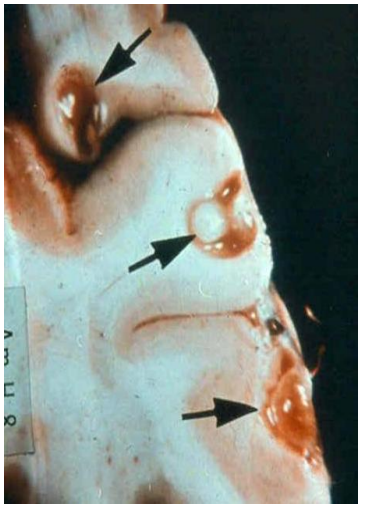


Scolex and proglotide of *Taenia solium*





Eggs of *Taenia* sp.



Cysticercus in brain

TAENIA SOLIUM AND CYSTICERCOSIS

- The pork tapeworm ***T. solium*** can cause two distinct forms of infection:
  - Humans can be infected with adult tapeworms in the intestine or
  - with larval forms in the tissues (cysticercosis).
- Humans are the only definitive hosts for *T. solium*; pigs are the usual intermediate hosts.
- *T. solium* exists worldwide but is most prevalent in Latin America, sub-Saharan Africa, China, southern and Southeast Asia, and eastern Europe.
- Often only one adult worm is present, it may live for years, it is usually about 3 m in length, may have as many as 1000 proglottids, each of which produces up to 50,000 eggs.
- Infections that cause human cysticercosis follow the ingestion of *T. solium* eggs, usually from close contact with a tapeworm carrier. Autoinfection may occur.

CYSTICERCOSIS

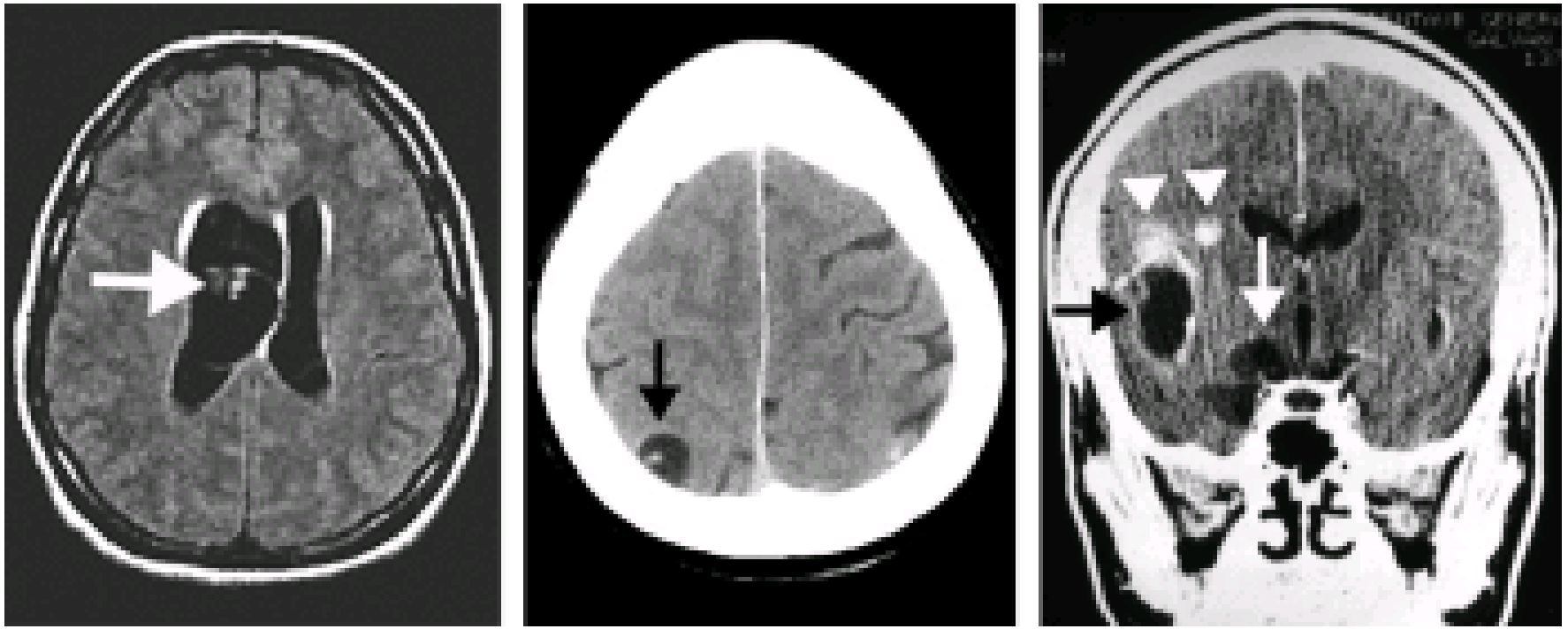
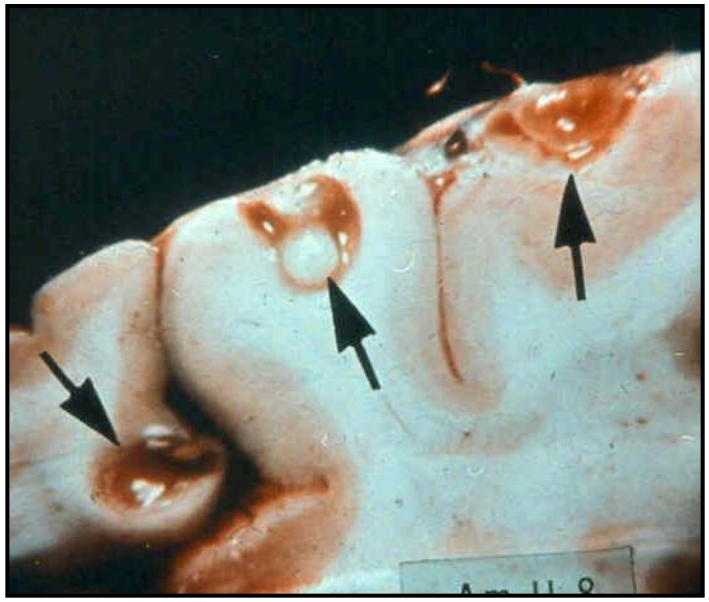


FIGURE 204-1 Neurocysticercosis is caused by Taenia solium. Neurologic infection can be classified on the basis of the location and viability of the parasites. When the parasites are in the ventricles, they often cause obstructive hydrocephalus. Left: MRI scan showing a cysticercus in the lateral ventricle, with resultant hydrocephalus. The arrow points to the scolex within the cystic

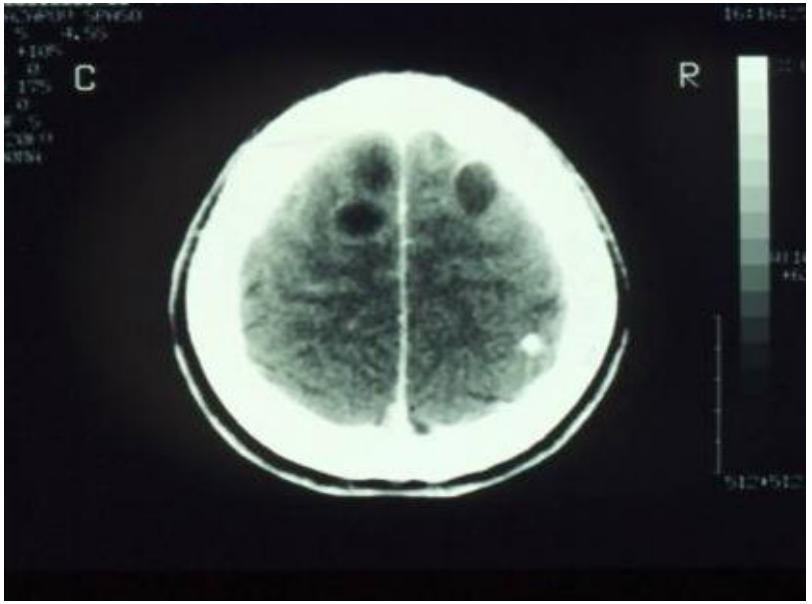
NEUROCYSTICERKÓZA

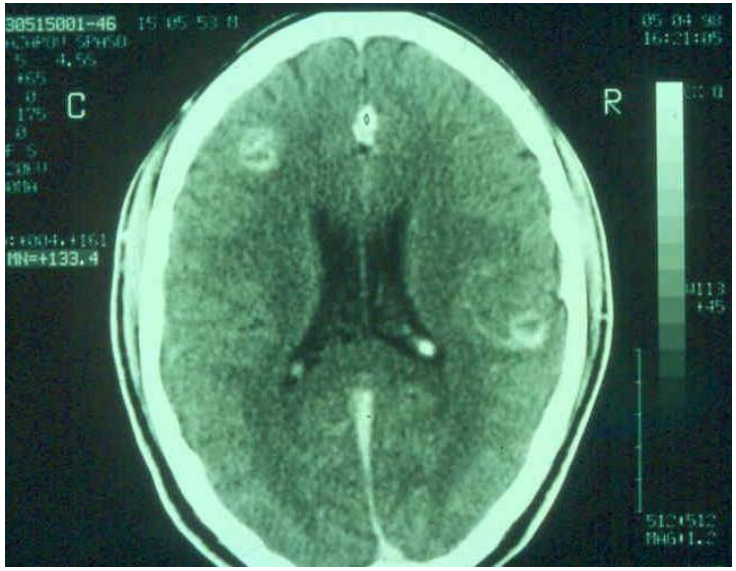
- Klinické příznaky závisí na lokalizaci a počtu cysticerků:
  - Epilepsie – nejčastější příčina v tropech
  - Parézy mozkových nervů, infarkty CNS, míšní syndromy
  - Demence (cysty ve frontálním laloku, děti)
  - Bazální meningitida, hydrocefalus
- Diferenciální diagnostika eozinofilní meningoencefalitidy:
  - Cysticerkóza
  - Angiostrongyloidóza
  - Spinocerebrální gnathostomóza
- Diagnóza:
  - CT, NMR
  - Kalcifikace na RTG hlavy
  - Serologie může být negativní
  - Eozinofílie může chybět

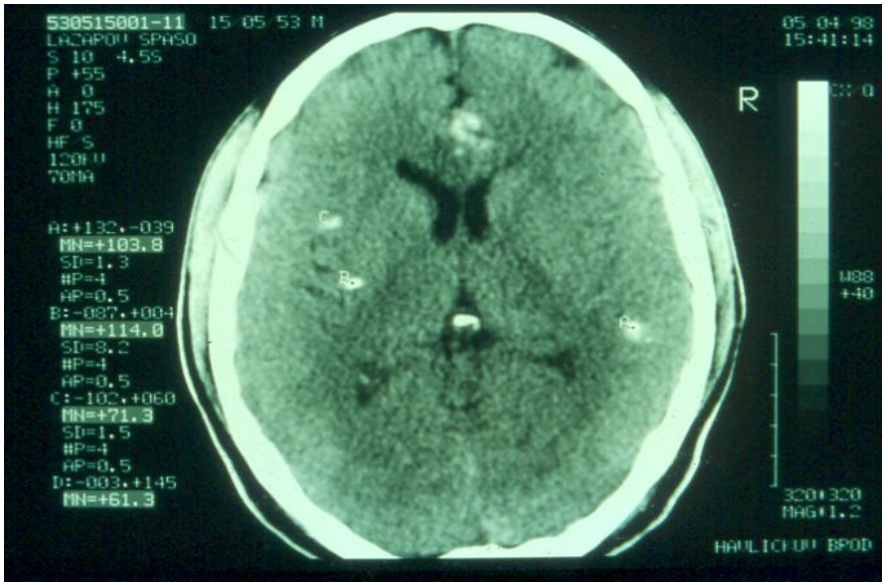


NEUROCYSTICERKÓZA

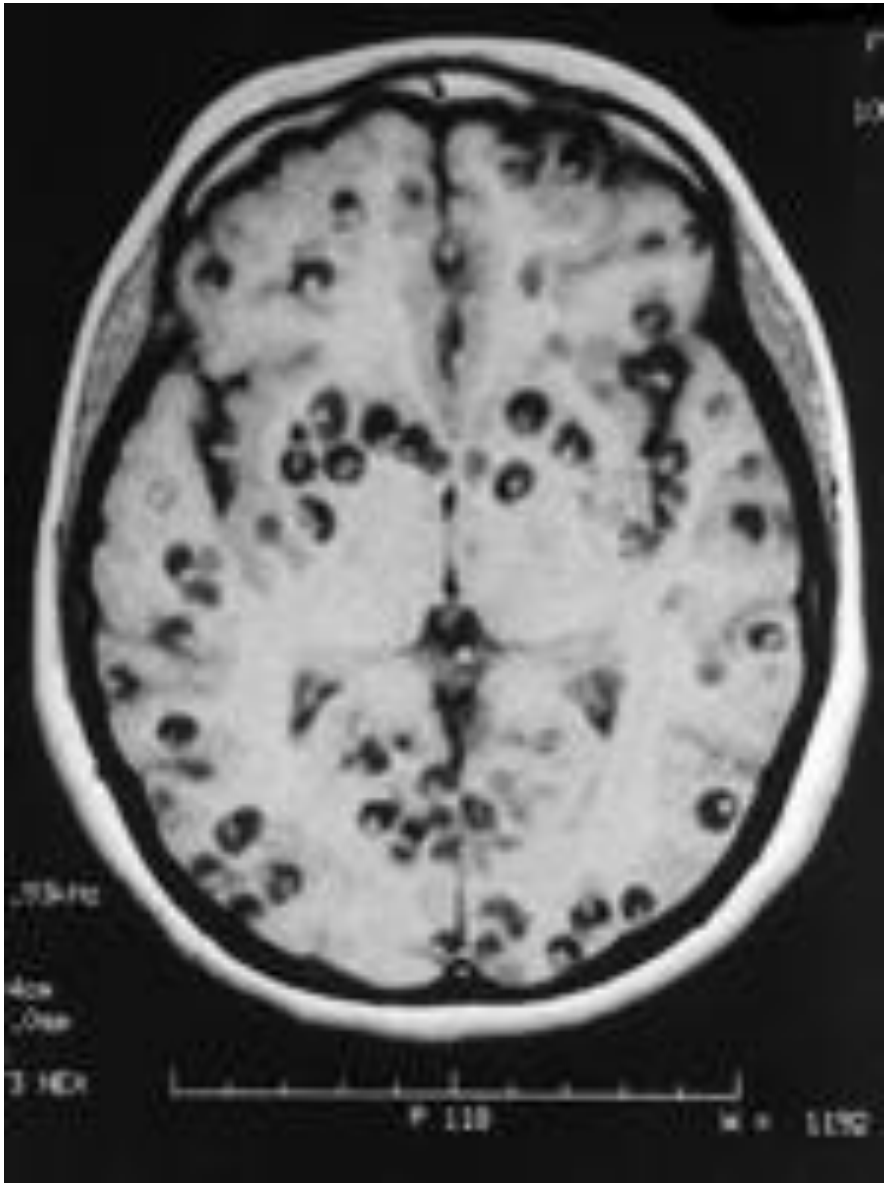
- Pacient z Bosny hospitalizován po krátkém bezvědomí a křečích
- Serologie byla pozitivní na cysticerkózu i hydatidózu



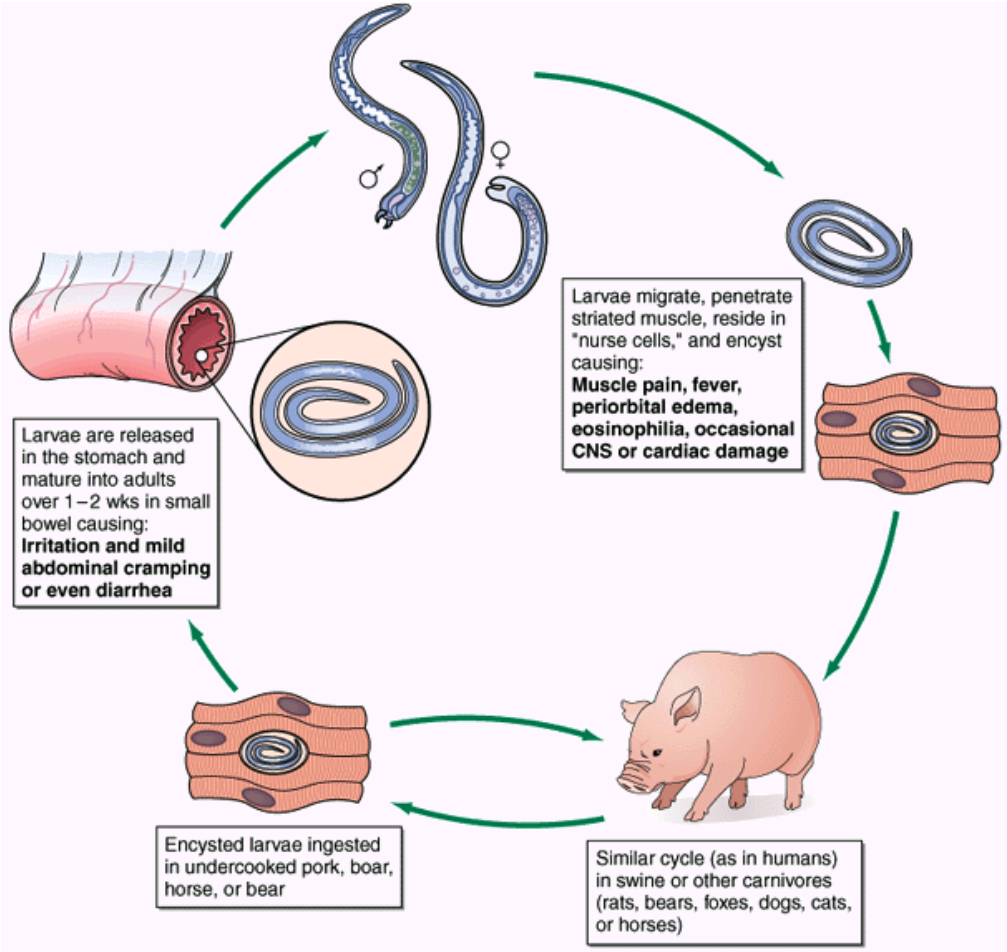




NEUROCYSTICERKÓZA



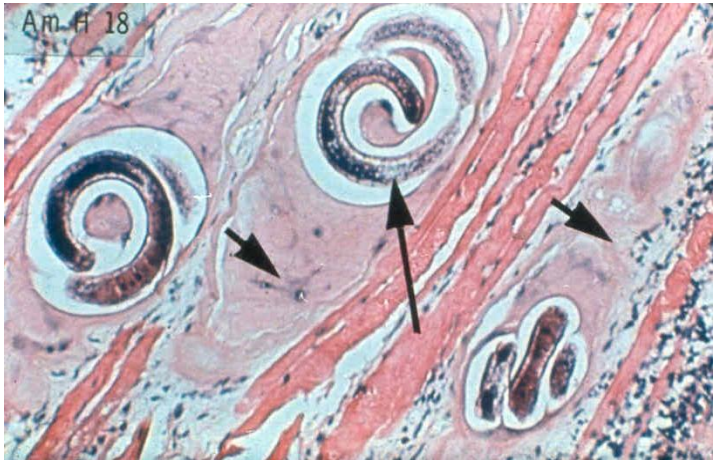
TRICHINELLOSIS



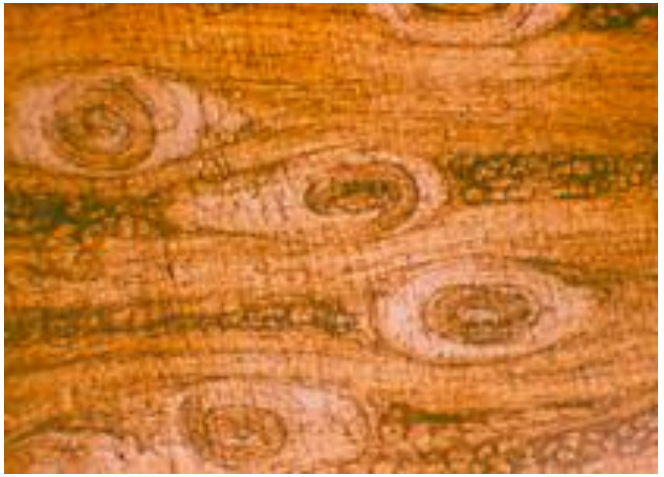
Life cycle of Trichinella spiralis (cosmopolitan); nelsoni (Africa); britovi (S. Europe); nativa (Arctic); and pseudospiralis (New Zealand).

KLINIKA TRICHINELÓZY

- Střevní fáze infekce: 2. – 10. den po infekci u 10 – 60% nakažených: zvracení, průjem
- Svalová fáze infekce: 2. týden po infekci → migrace larev do svalů a vnitřních orgánů
  - Horečka, myalgie, slabost, únava, periorbit edémy - u 80-100% pac.
  - Bolesti hlavy, konjunktivitida, otoky končetin, vyrážka - u 20-50%
  - Eosinofílie 10-60% (u >90%), ↑ IgE, ↑ CK, ↑ LDH, ↑AST (u >60%)
  - Komplikace: Invaze do CNS, myokarditida, pneumónie; † 0-10 %



Larvy ve svalech



Trichinoskopie

TERAPIE TRICHINELÓZY

- Thiabendazol
  - 25-50 mg/kg/den ve 2 dávkách (max. 3 g/den)
  - Nasadit do 1 týdne po infekci, působí na dospělé červy
- Mebendazol
  - 1.-3. den: 100-200 mg 3x denně
  - 4.-14. den: 400-500 mg 3x denně
- Albendazol
- Kortikosteroidy
- Symptomatická léčba

Larvální stádia ve svalech jsou terapeuticky obtížně ovlivnitelná