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Siarhei Panko[1, 2], **Aleksandr Karpinski**[2], **Andrey Shestiuk**[2]
[1] Zakład Pedagogiki i Dydaktyki Medycznej
Instytut Zdrowia Publicznego
Wydział Nauk o Zdrowiu Akademii Świętokrzyskiej w Kielcach
Kierownik Zakładu: prof. dr hab. n. med. Siarhei Panko
[2] Brest Regional Hospital, Brest, Belarus
Aleksandr Karpinski

ROLE OF LABORATORY AND INSTRUMENTAL METHODS IN DIAGNOSTICS OF ESOPHAGEAL PERFORATIONS

ROLA LABORATORYJNYCH I INSTRUMENTALNYCH METOD W ROZPOZNAWANIU PRZEDZIURAWIENIA PRZEŁYKU

SUMMARY

To evaluate the results of the diagnostics of patients with esophageal perforation in order to determine the most appropriate management of this pathology.
Retrospective study of 12 patients was performed who presented with esophageal perforation to our hospital between 2002 and 2006 (iatrogenic, foreign body ingestion and with Boerhaave's syndrome). Leukocytes Index of an Intoxication (LI), radiological and endoscope diagnostic of esophagus ware examined.
The most authentic diagnostically method of esophageal injuries is radiological examination so as X-ray-examination with a contrast substance enables to confirm esophageal perforation about 60% of patients. Fiberscopes examination has a supporting role in diagnostics of esophageal perforation and should be applied in cases of the doubtful diagnosis.
There is necessary to carry out complete examination of patients for confirmation of the diagnosis oesophageal perforation.

Key words: esophagus, perforation, diagnostic, endoscope, radiological.

STRESZCZENIE

Celem pracy była ocena skuteczności radiologicznego i endoskopowego badania przełyku oraz oznaczenie leukocytowego indeksu intoksykacji (LI) krwi w rozpoznawaniu przedziurawienia przełyku (PP). Zbadano retrospektywnie 12 pacjentów leczonych w latach 2002-2006 z powodu perforacji przełyku na Oddziale Chirurgii Klatki Piersiowej Brzeskiego Obwodowego Szpitala. Przyczyną przedziurawienia ściany przełyku w 2 przypadkach był zespół Boerhaave, w 7 – uszkodzenie jatrogenne, w 2 – ciało obce i w l przypadku – uraz.
Najbardziej czułą metodą rozpoznania uszkodzenia przełyku jest badanie radiologiczne z podaniem środka cieniującego, które pozwala na lokalizację miejsca pęknięcia u 60% badanych. Ezofagoskopia ma znaczenie uzupełniające w przypadkach, w których brak jest odmy i płynu w opłucnej czy poszerzenia śródpiersia, a środek cieniujący nie przedostaje się poza światło przełyku podczas badania radiologicznego. Również oznaczenie leukocytarnego indeksu intoksykacji (LI) jest pomocne w ocenie zaawansowania zmian ropnych w okolicy pęknięcia przełyku, wyborze sposobu leczenia i rokowaniu.

Wczesne rozpoznanie przedziurawienia przełyku oraz ocena zaawansowania procesu zapalnego w śródpiersiu wymagają kompleksowego podejścia diagnostycznego. Podstawowym badaniem jest ocena radiologiczna z podaniem kontrastu, a uzupełniającym – ezofagoskopia i oznaczenie LI.

Słowa kluczowe: przełyk, przedziurawienie, rozpoznanie, endoskopia, badanie radiologiczne.

INTRODUCTION

Esophageal injury is a terrible pathology with the common mortality rates within 28-85% [1, 2]. The delay in an statement of the correct diagnosis is one of factors of a failure treatment [3]. Objective examination of the patient not in all cases shows symptoms of esophageal perforation that leads to diagnostic mistakes. Moreover, clinical symptoms not often indicate exact localization and extension of pathological process. Application of the common clinical analyses of blood, radiological and endoscopies diagnostics are available in all surgical hospital.

OBJECTIVE

To evaluate the results of the diagnostics of patients with esophageal perforation in order to determine the most appropriate management of this pathology.

MATERIAL AND METHODS

We performed a retrospective study of 12 patients (4 men and 8 women mean age 53 years; 28-74) who presented with esophageal perforation to our hospital between 2002 and 2006. The causes of esophageal perforations ware: iatrogenic instrumentation perforation of the esophagus during endoscopy or dilation of esophageal stricture in 7 cases (58%), foreign body ingestion in 2 (16%) cases, spontaneous rupture of the oesophagus (Boerhaave's syndrome) in 2 (16%) and a outcome of a thoracic trauma one case.

At four patients the diagnosis has been obtained later than 24 hours from time of illness beginning. Postoperative complications have been noted at 4 of 12 cases (33%). In half of examined cases (6 patients) injuries were localized in thoracic part of esophagus, in 5 cases in cervical and one patient had a rupture of abdominal esophagus.

Following parameters are examined and analyzed:

1. Laboratory findings, e.g. white blood cell count and a Leukocytes Index of an Intoxication (LI) at the moment receipt in the hospital and within 7-10 days after operation.
2. The standard X-ray examination of a thorax and an esophageal X-ray graphic with a contrast agent in supine position performed in day of receipt.
3. Endoscope diagnostic of esophagus at receipt in a hospital.

RESULTS

These results are summarized in tables 1 and 2.

Table 1. The characteristic of esophageal injuries cases treated for 2002-2006

Number	Age/Sex	An interval from injury to operation in hours	The cause of esophageal injury	Localization of injury	Blood analysis		Radiological data	The description of an Endoscopies pictures of esophagus	Postoperative complications
					Leukocytes *10^3mcL/LI at receipt	Leukocytes *10^3mcL/LI in 7 days after operation			
1	2	3	4	5	6	7	8	9	10
1.	54/m	> 24	spontaneous rupture	Lower 1/3 of thoracic part	18.0/4.78	13.1/0.54	Contrast leakage to pleural cavity, piohydrothorax	Defect of esophageal wall	–
2.	47/w	> 24	iatrogenic-endoscope	Upper 1/3 of thoracic part	17.4/15.6	10.0/5.8	Contrast leakage to mediastinum	–	+
3.	62/w	< 24	iatrogenic-endoscope	Cervical part	10.0/5.52	26.8/ 32.25	Contrast leakage to mediastinum, subcutaneous emphysema	–	+
4	50/w	< 24	iatrogenic-endoscope	Lower 1/3 of thoracic part	11.2/7.7	9.3/1.42	Contrast leakage to mediastinum	Defect of esophageal wall	–
5.	74/m	< 24	foreign body perforation	Upper 1/3 of thoracic part	11.2/5.5	8.3/0.15	subcutaneous emphysema, mediastinal emphysema	foreign body with injury of mucous	–

1	2	3	4	5	6	7	8	9	10
6.	28/m	> 24	trauma	Cervical part	14.0/1.54	8.6/2.0	subcutaneous emphysema, dilatation of mediastinum	Hypostasis of mucous with fibrin	–
7.	65/w	> 24	spontaneous rupture	Lower 1/3 of thoracic part	12.5/4.52	7.1/0.73	Contrast leakage to pleural cavity	Defect of esophageal wall	–
8.	44/m	< 24	iatrogenic-endoscope	median 1/3 of thoracic part	10.7/4.15	6.3/4.9	Contrast leakage to mediastinum mediastinal emphysema	Defect of esophageal wall	+
9.	73/m	< 24	iatrogenic-dilation	Cervical part	17.6/11.8	9.0/0.4	emphysema	–	–
10.	55/w	< 24	iatrogenic-dilation	Abdominal part	11.1/8.9	6.8/4.2	Contrast leakage to abdominal cavity	Hypostasis of mucous with fibrin	+
11.	54/m	< 24	iatrogenic-dilation	Cervical part	10.1/7.3	5.9/0.52	emphysema of surrounding tissues and mediastinal emphysema	Hypostasis of mucous with fibrin	–
12.	34/w	< 24	foreign body perforation	Cervical part	12.6/6.7	7.2/0.22	emphysema of surrounding tissues and dilatation of mediastinum	foreign body with injury of mucous	–

The Leukocytes Index of an Intoxication (LI) increased in all groups of patients. However, the most significant increase LI is noted among patients with iatrogenic injuries of esophagus (8.61), that reflected hardness and expansion of inflammatory process. Leukocytes count has increased up to 15.4 and LI up to 6.61, among patients accepted more than in 24 hours from the moment of esophageal injuries that characterized duration of inflammatory process.

Table 2. Leukocytes count in peripheral blood and LI

Groups of patients	At the moment of receipt in hospital	
	Leukocytes (*10^3mcL)	LI
Iatrogenic injuries (n=7)	12.6	8.61
Spontaneous rupture (n=2)	15.25	4.65
Foreign body perforation (n = 2)	11.9	6.1
Posttraumatic injury (n = 1)	14.0	1.54

In 7 days after operative intervention, average leukocytes count in peripheral blood was 9.8 *10^3mcL (within the limits of 5.9-26.8), and average parameter LI 4.48 (from 0.15 to 32.3). The average value of leukocytes count was leveled 8.56 *10^3mcL and LI – 0.74, if the postoperative period had no complications.

Whereas, at presence of complications in the postoperative period (n = 4) leukocytes count was 12.5 *10^3/ mcL and LI – 11.8.

Radiological examination is the most valuable, accessible and informative diagnostic method [4]. Polypositioned X-ray scopy of esophagus was carried out to all patients. Contrast leakage through esophageal contours has been revealed in 7 patients (58%). Subcutaneous emphysema and mediastinal emphysema also have revealed in 7 cases. Extension of mediastinum and cervical cellular cavities due to inflammatory infiltration have appeared in 3 cases. Contrast substance leakage – 71% (5/7) and emphysema of surrounding tissues – 57% (4/7) met more often in group of patients with iatrogenic esophageal injuries. Cervical esophagus perforation was always accompanied by dilatation of cervical interfascial spaces. Pneumohydrothorax was only marked in cases of a spontaneous rupture of the bottom thoracic part of esophagus.

Esophageal endoscopy is executed in 9 (75%) patients. The authentic attribute of esophageal injury – "defect of its wall with a fistula similar way to surrounding tissues" has been revealed in 4 (44%) cases only. In other cases indirect symptoms of esophageal injuries such as a hypostasis mucous with fibrin (n = 3) and damage of a mucous membrane (n = 2) have been found out.

CONCLUSIONS

1. At present there is no diagnostic method which always would confirm the diagnosis "esophageal perforation". The most authentic diagnostically method of esophageal injuries is radiological examination so as X-ray-examination with a contrast substance enables to confirm esophageal perforation about 60% of patients.
2. The anamnesis of disease and presence of radiological symptoms of mediastinal emphysema or extensions and emphysema of an interfascial spaces allows to determine the exact diagnosis in other cases.

3. Fiberscopes examination has a supporting role in diagnostics of esophageal perforation and should be applied in cases of the doubtful diagnosis.
4. Blood the analysis has no specificity for this pathology. The Leukocytes index of intoxication is the most informative and specifying extension of inflammatory process parameter and also is "a marker of well-being" of patients in the postoperative period.
5. There is necessary to carry out complete examination of patients for confirmation of the diagnosis "esophageal perforation".

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