

Inguino-crural hernias: preoperative diagnosis and post-operative follow-up by high-resolution ultrasonography. A personal experience



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Background

The abdominal wall hernias have an accuracy of 5% in world population. The 90% interests the inguino-femoral region, with the accuracy of 90% for the men for what concerns the inguinal hernia, and 80% for the women for what concerns the femoral hernia. The evaluation of the patient affected by hernias of the inguino-femoral region is on the basis of careful anamnesis and of careful clinical exam which is able to arrive to the diagnosis on the kind of hernia in the majority of cases. The high resolution ultrasonography (US-HR) is a non invasive method of recent introduction in the study and in the evaluation of the hernias of the inguino-femoral region (5, 9, 10).

The purpose of this study was to value the sensitivity and specificity of US-RH for the preoperative evaluation, through the site (inguinal or femoral), the kind (direct or oblique), the hernial nature or an other pathology of the region, and in the postoperative follow up (recurrence and complications) of hernial pathology of inguino-femoral region.

Materials and methods

From September 1997 to February 2000, 140 patients underwent study using the US-HR in the first Surgical

Abstract

Background: *Hernia is an important pathology with an incidence of 5% in world population. The more affect region is the inguino-femoral. Normally the diagnosis was based on the clinical exam. A short time ago the high resolution ultrasonographic study was introduced. The purpose of our study was to value the sensitivity of US-HR in the preoperative diagnosis, in the postoperative follow-up and to compare the results to clinical exam.*

Methods: *140 patients affect by inguino-femoral hernia underwent this study, 112 inguinal hernias, 28 femoral, 8 pediatric patients. 106 patients underwent repair through the prosthesis, in 34 Halstad-Postempsky's technique was carried out. Ultrasonography studied: a) inguino-femoral region, cord and scrotum (the study was effected in basal condition and through Valsalva's manoeuvre, decubitus changes); b) hernia content (omenuit, bowel); c) hernial orifice and of hernial content's transit (direct or indirect); d) the relation with the inguinal ligament; e) the vascularization (power-doppler) and the pathological situation (presence or absence of liquid in the sac, parietal thickness, presence/absence of peristalsis), in case of hernia complication; f) the presencelabsence of simultaneous pathologies (hydrocele, varicocele, cord's cyst).*

The postoperative study was effected after 7 days, 1-6-12 months we have observed: a) haematomas and seromas (under the skin, under the aponeurosis, scrotal); b) prosthesis displacement; c) prosthesis infection; d) prosthesis reject; e) recurrence (importance, site); f) we have carried out the treatment of the complications (echoguided drainage of serous and hematic collection).

Results: *the sensitivity of US-HR in the diagnosis of hernia was 87,5%. The clinical exam arrived at an average of 72%, the comparison was favourable to US-HR (15,5%). The sensitivity in the diagnosis of complication arrived at an average of 85,5% for US-HR, and of 36% for clinical exam; the gap between the two techniques was elevated (49,5%).*

Conclusions: *the US-HR showed an important accuracy and sensitivity thus to cover today an important role, after the clinical exam, in the preoperative diagnosis and in the postoperative follow-up of the inguino-femoral hernias.*

Key words: Hernia, high-resolution ultrasonology, pre-operative diagnosis, post-operative follow-up.

Riassunto

ERNIE INGUINO CRURALI: DIAGNOSI PREOPERATORIA E FOLLOW-UP POST CHIRURGICO MEDIANTE ULTRASONOGRAFIA AD ELEVATA RISOLUZIONE. ESPERIENZA PERSONALE

Introduzione: *L'ernia rappresenta una patologia significativa con un'incidenza del 5% su tutta la popolazione mondiale. La localizzazione di gran lunga più frequente è quella inguino-crurale. Solitamente la diagnosi viene posta con il semplice esame clinico. Recentemente è stata introdotta anche l'indagine ultrasonografica ad alta definizione. Lo scopo del nostro studio è di valutare la sensibilità dell'ultrasonografia ad alta definizione nella diagnosi preoperatoria e nel follow-up post-operatorio confrontando i risultati con l'esame clinico.*

Metodo: Sono stati studiati 140 pazienti con ernia inguino-crurale, 112 con ernia inguinale, 28 con ernia crurale, 8 pazienti pediatrici. In 106 pazienti è stato praticato intervento con apposizione di protesi, negli altri 34 è stato effettuato l'intervento secondo la tecnica di Halstad-Postemsky. Con l'ultrasonografi sono stati studiati: a) la regione inguino-crurale, il funicolo e lo scroto (in condizioni basali e durante l'esecuzione della manovra di Valsalva, con variazioni di decubito); b) il contenuto dell'ernia (omento, intestino); c) lo iato erniario ed il transito (diretto o indiretto) del contenuto erniario, d) i rapporti con il legamento inguinale; e) la vascolarizzazione (power doppler) e la situazione patologica (presenza o assenza di liquido nel sacco erniario, ispessimento della parete, presenza/assenza di peristalsi) in caso di ernie complicate; i) presenza/assenza di contemporanee patologie (idrocele, varicocele, cisti del funicolo). Lo studio post-operatorio, effettuato dopo 7 giorni e, rispettivamente, dopo 1, 6, 12 mesi ha evidenziato: a) ematomi e sieromi (sottocutanei, sottoaponeurotici, scrotali); b) dislocazione della protesi; c) infezione della protesi; d) rigetto della protesi; e) recidiva (rilevanza, sede); f) trattamento delle complicanze (aspirazione ecoguidata delle raccolte sieriche ed ematiche).

Risultati: La sensibilità dell'ultrasonografia ad alta definizione nella diagnosi di ernia è stata dell'87,5%. L'esame clinico ha raggiunto una media del 72%, il confronto favorisce l'ultrasonografia ad alta risoluzione (15,5%). La sensibilità della diagnosi delle complicanze raggiunge una media dell'85,5% per l'ultrasonografia ad alta risoluzione e del 36% dell'esame clinico; la differenza tra le due metodiche è stata elevata (49,5%).

Conclusioni: L'ultrasonografia ad alta risoluzione ha mostrato una elevata accuratezza e sensibilità e pertanto riveste oggi un ruolo importante, dopo l'esame clinico, nella diagnosi pre-operatoria e nel follow-up post-operatorio delle ernie inguino-crurali.

Parole chiave: Ernia, ultrasonografia ad alta risoluzione, diagnosi pre-operatoria, follow-up post-operatorio.

hernial orifice and the insertion of the mesh under the aponeurosis.

64 (25%) underwent hernia repair using the Halstad-Postemsky technique.

The inguinal hernias were 112 (M86/F26) and the femoral hernias were 28 (F22/M6).

8 patients were carriers of congenital hernia (mean age 8 - range 4-12). The recurrences were 8 (5%).

The patients carriers of "permagna" inguino-scrotal hernias were eliminated from the study because of obvious unutility of their sonographic exam.

All the patients underwent preoperative study through clinic exam and US-RH (all the exams were always carried out by the two same surgeons with a high ultrasonography with lineal array 7,5 - 11 MHz).

The clinical exam was always carried out by another surgeon in order to compare this two methods.

The patients underwent the same exam in the postoperative follow-up with the same method.

The preoperative study with US-HR, after a careful clinical and anamnestic evaluation was effected in relation to these parameters:

- The study of inguino-femoral region, of the cord and the scrotum;
- The study in basal conditions and by Valsalva's manoeuvre;
- Decubitus changes;
- Evaluation of hernial content (omentum, bowel);
- Evaluation of hernial orifice and of hernial content's transit (direct or indirect);
- Relations with inguinal channel;
- Vascular perfusion (power-doppler) and pathological situation (presence or absence of liquid in the sac, parietal thickness, presence or absence of peristalsis) in the cases of hernial complications;
- Presence or absence of simultaneous pathologies (hydrocele, varicocele, cord's cyst).

The postoperative study was applied to the individualization of:

- Complications: haematomas and seromes (under the skin, under the aponeurosis, or scrotal);
- Prosthesis' displacement;
- Prosthesis' infection;
- Prosthesis' reject;
- Recurrence;
- Complications' treatment (drainage echoguided of serous or hematic collection).

The diagnosis of the haematoma and the seroma was based on the presence of a fluid collection in the thickness of the wall or in the cord's transit or in the scrotal sac.

The prosthesis displacement appears as a presence of a foreign body (plug) outside the inguinal ring. The posterior displacement in retroperitoneal site is difficult to be diagnosed by sonography.

The infection and the reject of the prosthesis appears with a cellular collection or with an ipoechoic area periprosthetic, both are located down the aponeurosis.

Clinic of the General University Hospital of Messina. 114 of these (81%) were admitted in election and 26 (19%) were admitted as an emergency for hernial complications. All the patients underwent surgical repair of hernia. 106 (75%) underwent surgical repair using Trabucco's technique (T1-T2) with the plug's apposition in the

Tab. I – PERSONAL EXPERIENCE AND SENSIBILITY OF PREOPERATIVE ASSESSMENT. (*) US-HR: HIGH-RESOLUTION ULTRASONOGRAPHY. T.I-II: TRABUCCO I-II. H-P: HALSTED-POSTEMPSKY.

<i>Type of Hernia</i>	<i>Number</i>	<i>Surgical Technique</i>	<i>Sensibility US-HR (*)</i>	<i>Sensibility of clinical assesment</i>
Indirect "small"	30	T.I-II/H-P	97,4%	78%
Direct "small"	18	T.I-II/H-P	95,6%	81%
Indirect "large"	31	T.I-II	100%	96%
Direct "large"	15	T.I-II	97,6%	92%
Femoral	28	T.I-II	84%	72%
Pantaloon	10	T.I-II:H-p	38%	24%
Recurrent	8	T.I-II	79,4%	62%
Pediatrics patients	8		93%	74%
Tot.	140		87,5%	72%

The differential diagnosis was made thanks to echoguided samples of this collection. The presence of lym-phocytes and of monocyte-macrophages indicates rejects. The presence of purulent material and of neutrophil leucocytes with positive culture suggests prosthetic infection.

The diagnostic confirmation, valued by sensitivity expressed in percentage, was effected intraoperatory, after we had valued the hernia relations with inguinal channel and with inguinal ligament.

The postoperative study and the follow-up was effected for 7 days, 1-6-12 months from the surgical operation.

In conclusion we can compare the diagnostic accuracy of clinical semeiotics with the sonographic study.

Results

In total 140 patients have been studied. All of them have undergone a follow-up, the sensitivity of the US-HR in the diagnosis of inguino-femoral hernia, resulted in a total of 87,5% with a maximum point of 100% for the inguinal voluminous hernias, and a minimum point of 38% for the pantaloons hernias (Tab. I).

The clinical exam has scored accuracy of 72%, the sensitivity in the postoperative complications diagnosis is on our average of 85%. The lowest value was found in the prothesis reject (66%), the highest in the haematoma-serom's diagnosis (100%), in the recurrent hernias are of 100% (Tab. I).

The clinical exam has in total an accuracy amounted to 36%, for the extremely low possibility of diagnosis concerning the reject and the prothesis' displacement.

Discussion and Conclusions

The study of the patient suffering from hernial pathology is historically limited to the only clinical exam of the region with the semeiotical evaluation of the hernia, of the hernial orifice, of the inguinal region.

First the high resolution real time sonography, was limited exclusively to the differential diagnosis, as between femoral

hernia and inguinal lymphadenopathy, Spigelian hernia and others neoformations of the anterolateral abdominal wall, then its application increased taking the place of old herniography or of expensive exams (RM; TC) (7, 8, 10, 11, 12).

The advent, besides, of the prosthetic surgery for the inguinal hernia, in our opinion, increased the use of this. The evaluation is on the basis of the groin hernia's study through the dimensional examination of the hernial orifice, and it also consents the real time vision of the transit of hernial bowel (Fig. 1, 2, 3). The differential diagnosis between direct or indirect hernia is easy, mostly precise on voluminous hernias, arriving at an average of 96% versus 84,7% of clinical examination in personal experience. Accuracy in the diagnosis is greater in children's hernia, in those ultrasonography permits the evaluation of the external inguinal orifice (normal size 4 mm) and the presence and the extension of hydrocele (communicating, cordal, scrotal) (3). A study reports a diagnostic accuracy that amountes to 97,9% versus 84% of only clinical exam (3). The postoperative follow-up searches early and late complications, effusions (haematomas, seromas), orchitis. The sensitivity of the ultrasound in these pathologies is 100% (Tab. II).

There aren't on the contrary, in literature, studies concerning postoperative follow-up, by means of US-HR, for prothetic repairs.

Tab. II – SENSIBILITY OF US-HR VS CLINICAL ASSESSMENT IN DETECTION OF HERNIOPLASTIC COMPLICATIONS. PERSONAL EXPERIENCE

<i>Type of Complication</i>	<i>Number</i>	<i>US-HR Sensibility</i>	<i>Clinical assesment sensibility</i>
Haematoma/seroma	18	100%	74%
Infection of proteses	8	72%	42%
Reject of proteses	3	66%	0%
Dislocation	1	100%	0%
Orchitis	4	75%	50%
Recidivate	2	100%	50%
Recurrent	8	79,4%	62%
Total	36	85,5%	36%

The postoperative follow-up is of use to value signs of reject in the use of prosthetic material.

Reject ultrasonographic signs are:

- Presence of ipoechoic shadow along the prosthesis;
- After second week presence of small local liquid collection.

It's useful to take a sample of material, in steril conditions, by echoguided needle aspiration in order to determine the nature of the liquid collection. Lymphocytosis, high quantity of proteins, absence of positivity at the cultural exam are specific elements of reject.

Neutrophilia, cultural positivity suggest prosthetic infection. The presence of liquid collection, early appearance (4-7 postoperative day) with high presence of red blood cells and/or proteins, low presence of inflammatory cells suggests an haematoma or serom.

Our conclusions are that the clinical exam covers today an important and principal role in the diagnosis of inguino-femoral hernia, but use of high frequency probes increased the diagnostic sensitivity and the accuracy in the final diagnosis.

Absolutely assential for us, in the postoperative follow-up with sonography, that can detecte early complications (haematoma, serom), not early (reject, infection, recurrence, prosthesis displacement). Sonography, also, permitts the evacuative treatment (therapeutic operative sonography) of pstoperative collection and the diagnosis of their nature (diagnostic operative sonography).

References

1) Akfirat M., Kazez A., Serhatlioglu S.: *Preoperative sonographic diagnosis of sliding appendiceal inguinal hernia*. J Clin Ultrasound, 27(3):156-8, Mar-Apr 1999.

2) Babkova I.V., Bozhko V.V.: *Ultrasound assessment in diagnosis of uncomplicated inguinal hernia*. Khirurgiia, 2:46-50, 1999.

3) Chen K.C., Chu C.C., Chou T.Y., Wu C.J.: *Ultrasonography for inguinal hernias in boys*. J Pediatr Surg, 33(12):1784-7, Dec 1998.

4) Losanoff J., Kjossev K.: *Preoperative diagnosis of strangulated obturator hernia using ultrasonography*. Am J Surg, 177(6):525-6, Jun 1999.

5) Gooding G.A.: *Sonography of the spermatic cord*. AJR, 151:721, 1988.

6) Leopold G.R., Woo V.L., Scheible F.W., Nactcheim D., Gosink B.B.: *High resolution ultrasonography of scrotal pathology*. Radiology, 131:719, 1979.

7) Mufid M.M., Abu-Yousef M.M., Kakish M.E., Urdaneta L.F., Al-Jurf A.S.: *Spigelian Hernia: diagnosis by high-resolution real-time sonography*. J Ultrasound Med, 16:183-87, Mar 1997.

8) Muller M., Truong S.N., Schumpelick V.: *Sonographic diagnosis of abdominal wall relaxation*. J Clin Ultrasound, 27:183-86, May 1999.

9) Konrenkov M., Paul A., Troidl H.: *Color duplex sonography: diagnostic tool in the differentiatin of inguinal hernias*. J Ultrasound Med, 18:565-8, Aug 1999.

10) Yeh H.C., Lehr-Janus C., Cohen B.A., Rabinowitz J.G.: *Ultrasonography and CT of abdominal and inguinal hernias*. J Clin Ultrasound, 12:479-86, Oct 1984.

11) Truong S., Pfinsten F.P., Dreuw B., Schumpelick V.: *Value of sonography in diagnosis of uncertain lesion of the abdominal wall and inguinal region*. Chirurg, 64:648-75, Jun 1993.

12) Van den Berg J.C., De Valois J.C., Go P.M., Rosenbusch G.: *Detection of groin hernia with physical examination, ultrasound and MRI compared with laparoscopic findings*. Invest Radiol, 34:730-43, Dec 1999.

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