SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
Azienda Ospedaliero - Universitaria di Ferrara

Workshop

La gestione multidisciplinare della complessità delle infezioni endoaddominali: esperienze a confronto

Ferrara, 27 Novembre 2015
Azienda Ospedaliera-Universitaria Ferrara
Nuovo "Arcispedale S. Anna "
Polo Ospedaliero Cona
Aula Congressuale

10:30 *R. Galeotti* (Fe) Imaging delle infezioni intraddominali: approccio interventivo

Imaging delle infezioni intraddominali : approccio interventistico

Roberto Galeotti

Dipartimento di Diagnostica per Immagini e Medicina di Laboratorio / Arcispedale S.Anna di Ferrara
Unità Operativa Semplice di Radiologia Vascolare ed Interventistica

Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

Organi solidi

Semeiotica specifica per differenziare vari tipi di ascesso tra loro

Raccolte intraperitoneali

A volte difficili da differenziare dalle anse intestinali

Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

- US
- TC
- RM
- MN
- Rx

Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

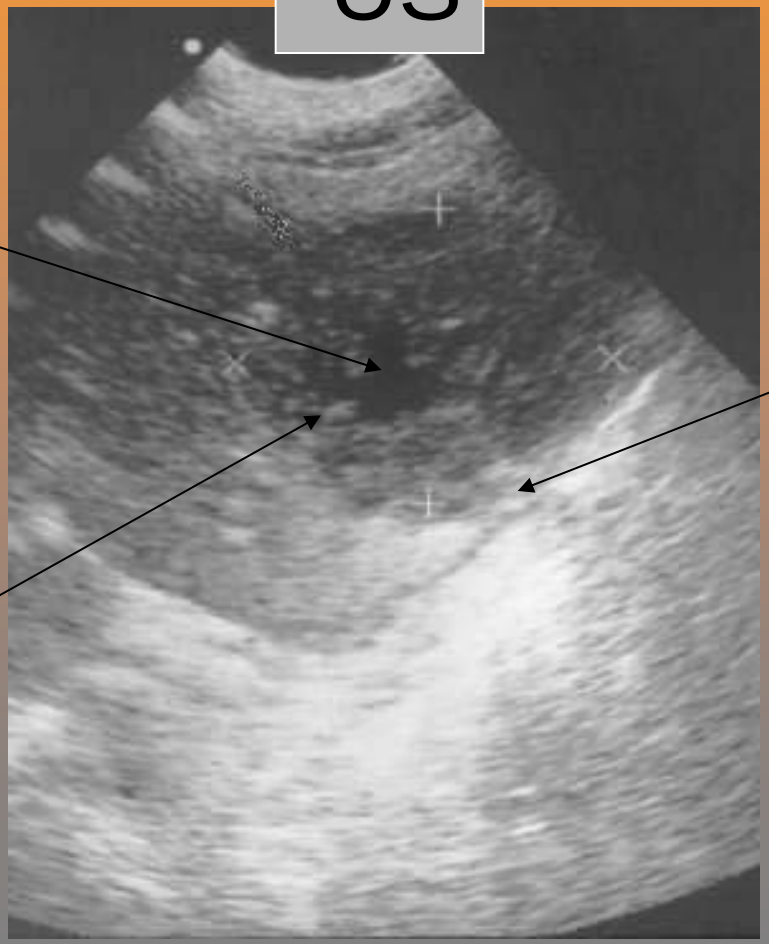
•US

- Prima istanza
- Eseguibile al letto
- Bene per gli ascessi degli organi
- Limitatata per le raccolte tra le anse (gas, cicatrici, adipe)
- Guida per agoaspirato

Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

- US



Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

- US

Guida per agoapirazione

Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

- TC

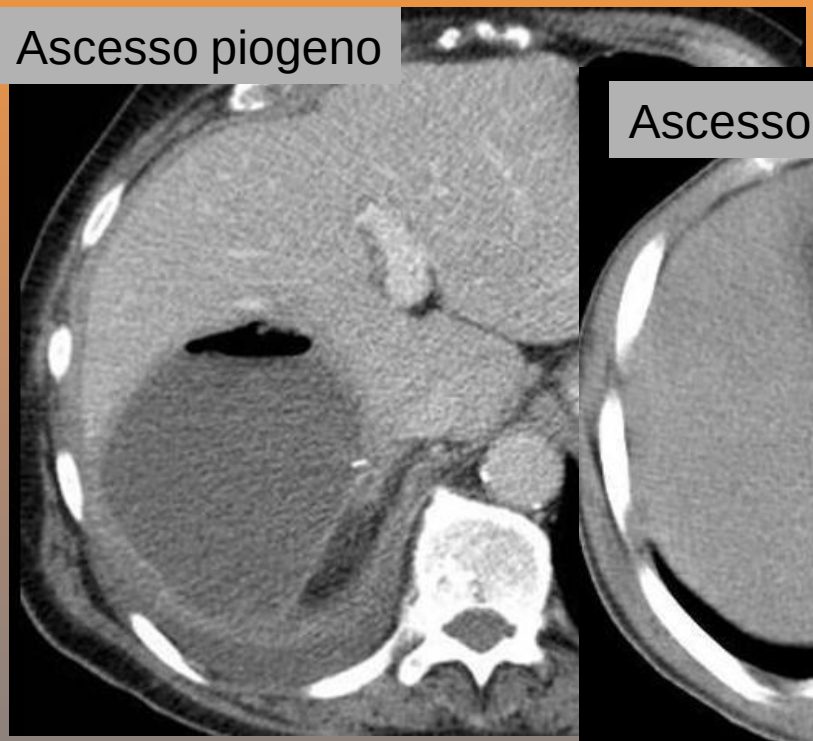
- Metodica di scelta
- Mdc e/v ed enterale
- Organi solidi: Semeiotica dedicata
- Raccolte intraperitoneale : Può suggerire la causa

Imaging delle infezioni intraddominali

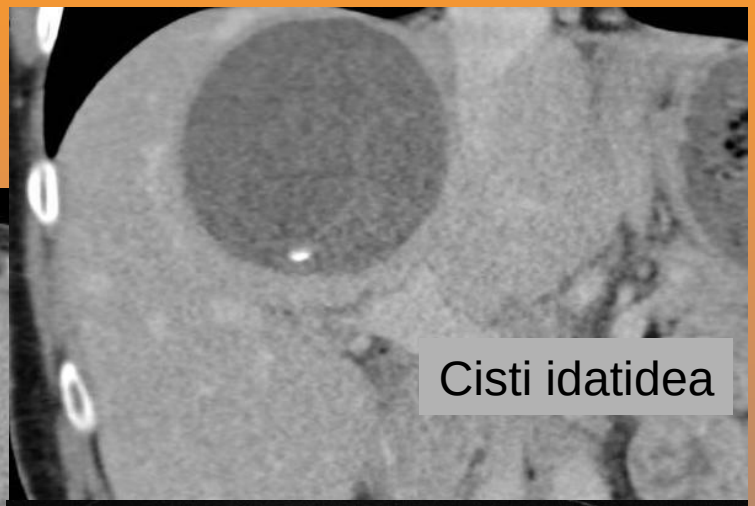
Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

- TC

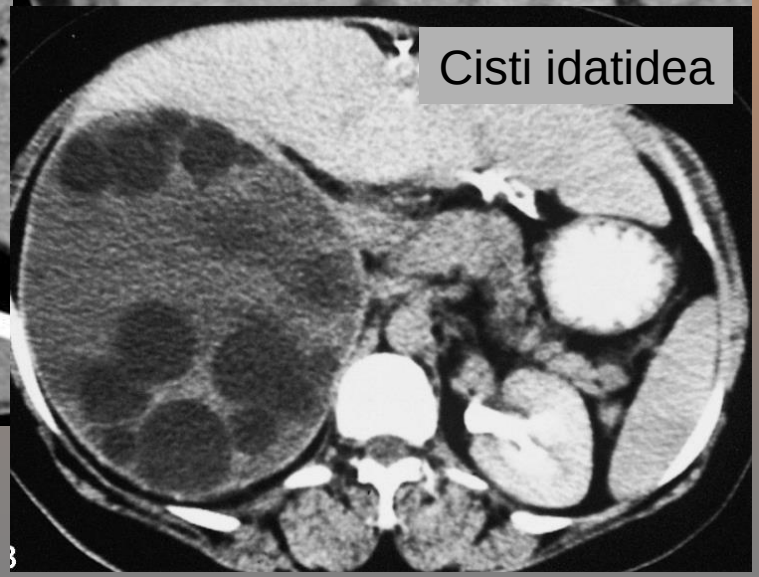
Ascesso piogeno



Ascesso amebico



Cisti idatidea



Cisti idatidea

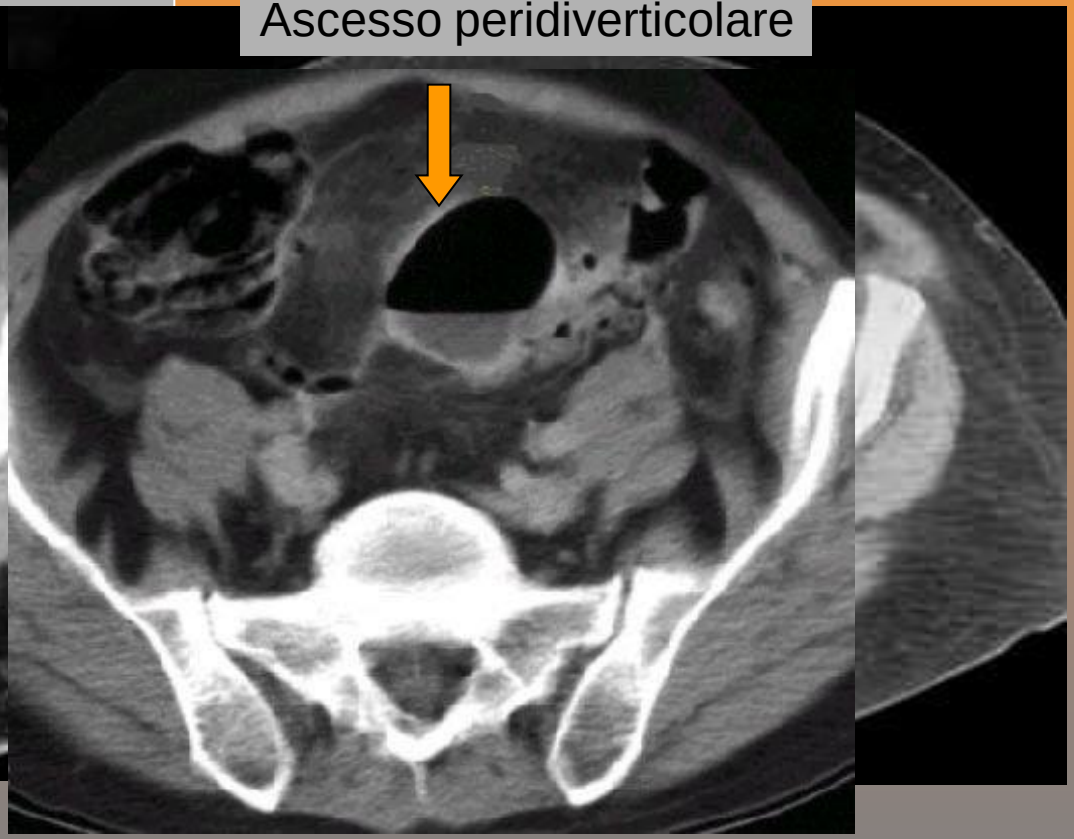
Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

- TC

Ascesso periappendicolare

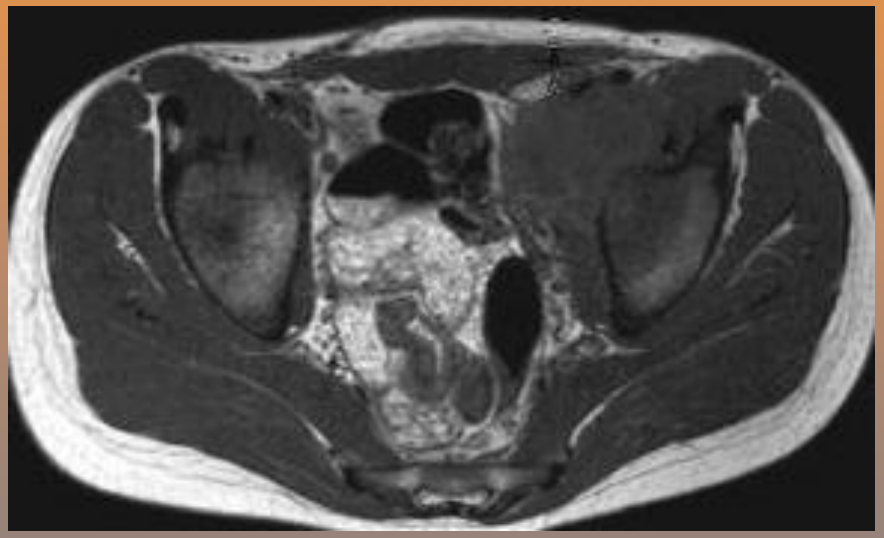
Ascesso peridiverticolare



Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

- RM



- Scarsa impiego (disponibilità, costi, artefatti, aspecificità)
- Utile nel dimostrare l’estensione della sepsi alle parti molli , ai muscoli ed alle ossa

Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

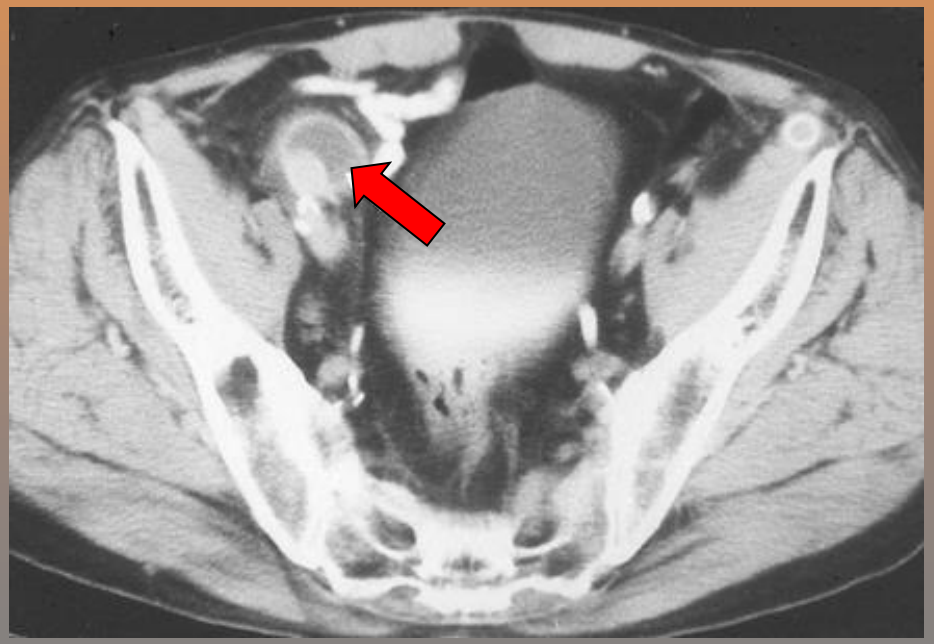
- MN

- Scintigrafia con ^{67}**Ga** o ^{111} **I - leucociti marcati**
- Alta specificità ma tempi troppo lunghi (18-72 ore)

Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

- MN



Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

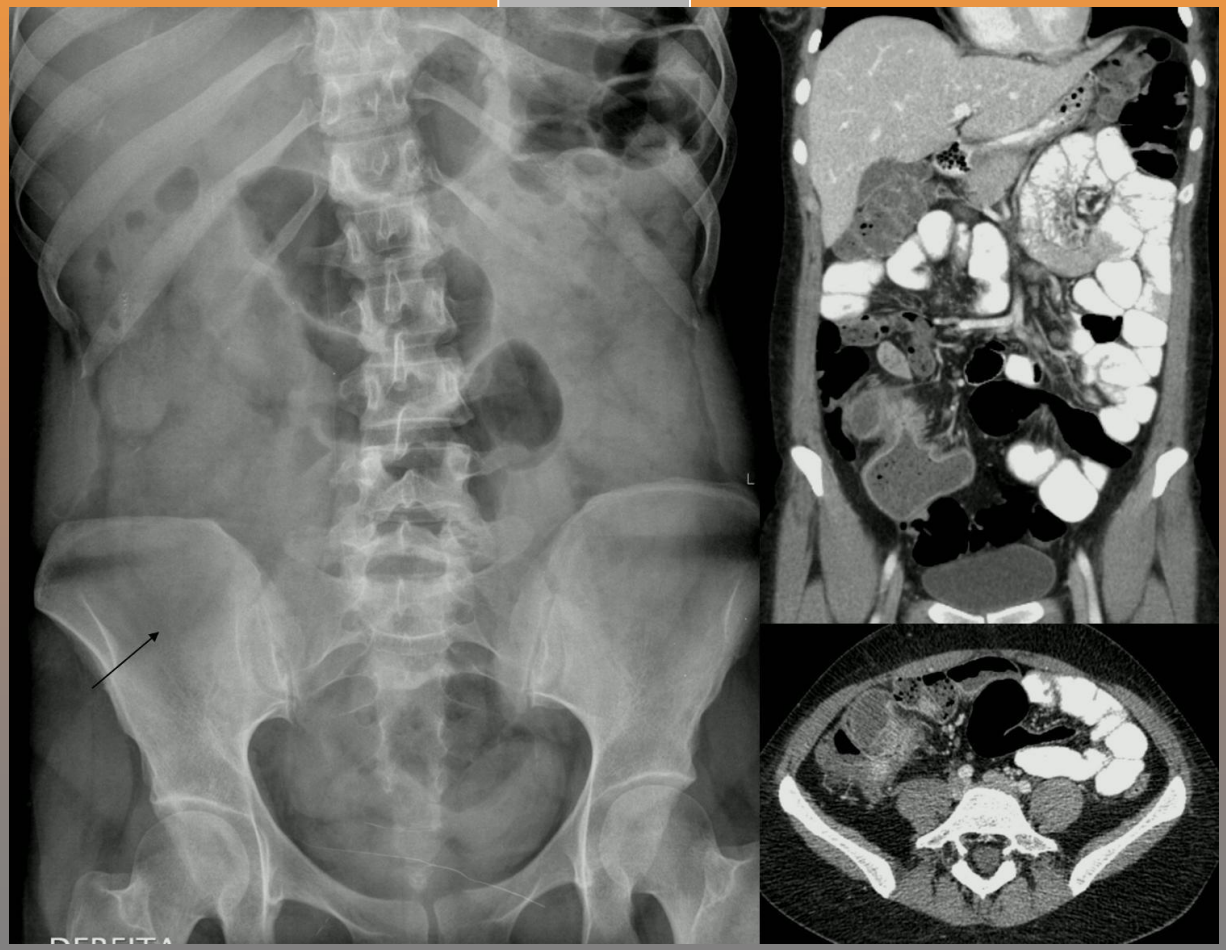
- Rx

- Effetto massa aspecifico
- Ileo
- Gas extraviscerale
- Contrastografia tragitti fistolosi

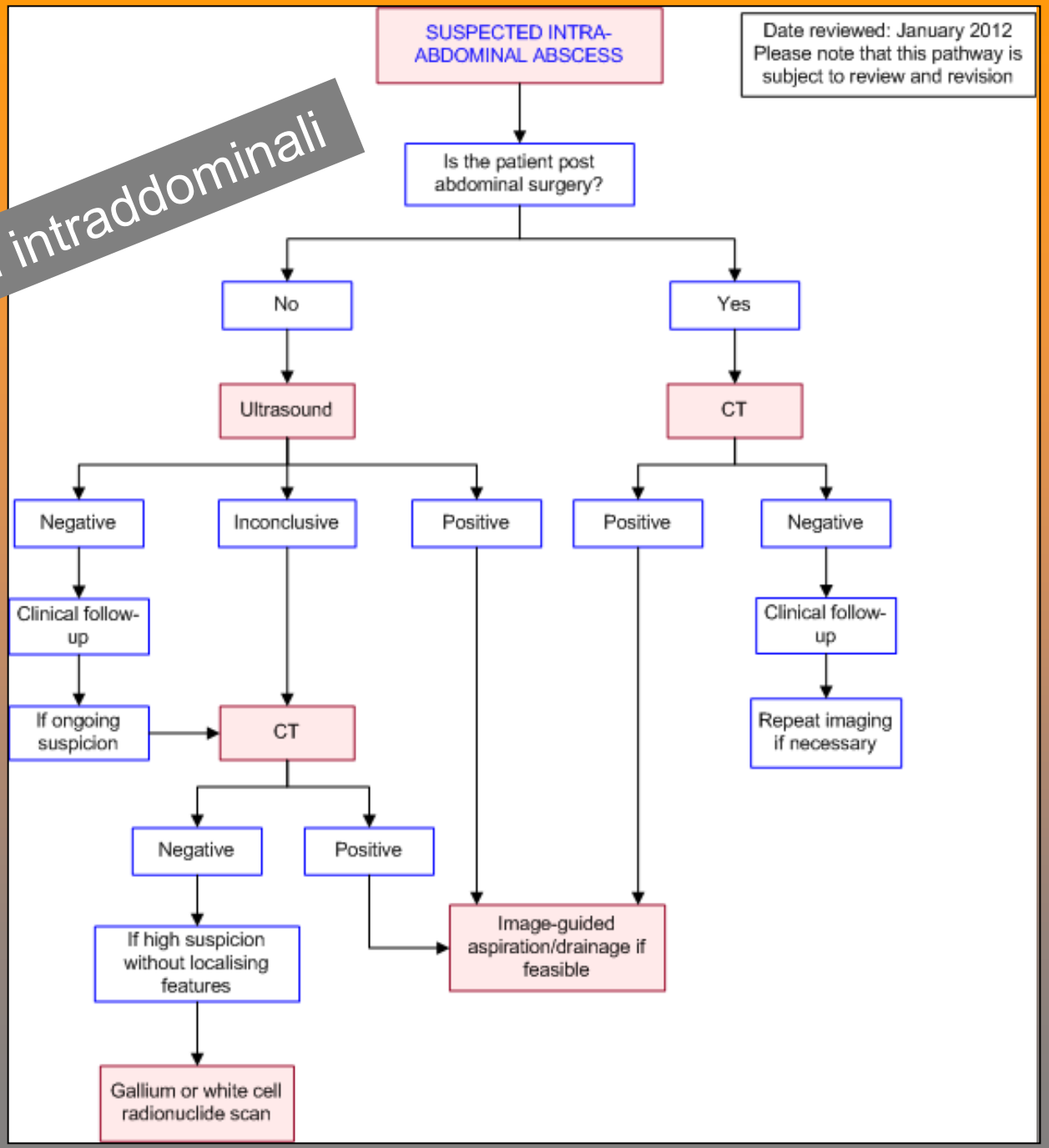
Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

- Rx



Imaging delle infezioni intraddominali



Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

ACR–SIR–SPR PRACTICE PARAMETER FOR SPECIFICATIONS AND PERFORMANCE OF IMAGE-GUIDED PERCUTANEOUS DRAINAGE/ASPIRATION OF ABSCESSES AND FLUID COLLECTIONS (PDAFC)

Amended 2014 (Resolution 39)*

DEFINIZIONI

Image-guided percutaneous drainage

Image-guided percutaneous drainage is defined as the placement of a catheter using image guidance to provide continuous drainage of a fluid collection, using access pathways that may be either transorificial (e.g., transrectal, transvaginal, peroral) or transcutaneous. It includes location of the fluid collection and placement of one or more catheters, and may also include catheter maintenance and eventual removal of the catheter(s). It may be performed during a single session or as a staged procedure during multiple sessions.

Image-guided percutaneous aspiration

Image-guided percutaneous aspiration is defined as evacuation or diagnostic sampling of a fluid collection using either a catheter or a needle during a single imaging session, with removal of the catheter or needle immediately after the aspiration.

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

INDICAZIONI

1. Suspicion that the fluid is infected or the result of an abnormal fistulous communication.
2. Need for fluid characterization.
3. Suspicion that the collection is producing symptoms sufficient to warrant drainage.
4. Need for an adjunctive procedure to facilitate the improved outcome of a subsequent intervention (e.g., paracentesis prior to liver intervention).

ACR–SIR–SPR PRACTICE PARAMETER FOR SPECIFICATIONS AND PERFORMANCE OF IMAGE-GUIDED PERCUTANEOUS DRAINAGE/ASPIRATION OF ABSCESSES AND FLUID COLLECTIONS (PDAFC)

Amended 2014 (Resolution 39)*

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

INDICAZIONI

considerazioni

Diagnostic aspiration may be the only means of determining whether a fluid collection is infected. For instance, while fever, leukocytosis, malaise, anorexia, or other systemic symptoms point to an infection, these signs and symptoms may be absent in elderly, very ill, or immunocompromised patients. If material that appears infected is obtained or if the operator suspects the presence of infection, a drainage catheter may then be placed.

ACR–SIR–SPR PRACTICE PARAMETER FOR SPECIFICATIONS AND PERFORMANCE OF IMAGE-GUIDED PERCUTANEOUS DRAINAGE/ASPIRATION OF ABSCESSES AND FLUID COLLECTIONS (PDAFC)

Amended 2014 (Resolution 39)*

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

INDICAZIONI

considerazioni

It is important to remember that Postoperative fluid collections are inevitable after

Imaging delle infezioni intraddominali

Riconoscimento e caratterizzazione delle raccolte ascessuali e possibilmente Individuazione della causa

Gnannt R, Fischer MA, Baechler T, Clavien PA, Karlo C, Seifert B, Lesurtel M ,Alkadhi H

Distinguishing infected from noninfected abdominal fluid collections after surgery: an imaging, clinical, and laboratory-based scoring system

Invest Radiol 2015 Jan;50(1):17-23.

Imaging features included attenuation (Hounsfield unit [HU]), volume, wall enhancement and thickness, fat stranding, as well as entrapped gas of fluid collections.

Laboratory and clinical parameters included diabetes, intake of immunosuppressive drugs, body temperature, C-reactive protein, and leukocyte blood cell count.

Multiple logistic regression analysis revealed diabetes, C-reactive protein, attenuation of the fluid collection (in HUs), as well as entrapped gas as significant independent predictors of infection ($P < 0.001$) and thus was selected for constructing a scoring system from 0 to 10 :

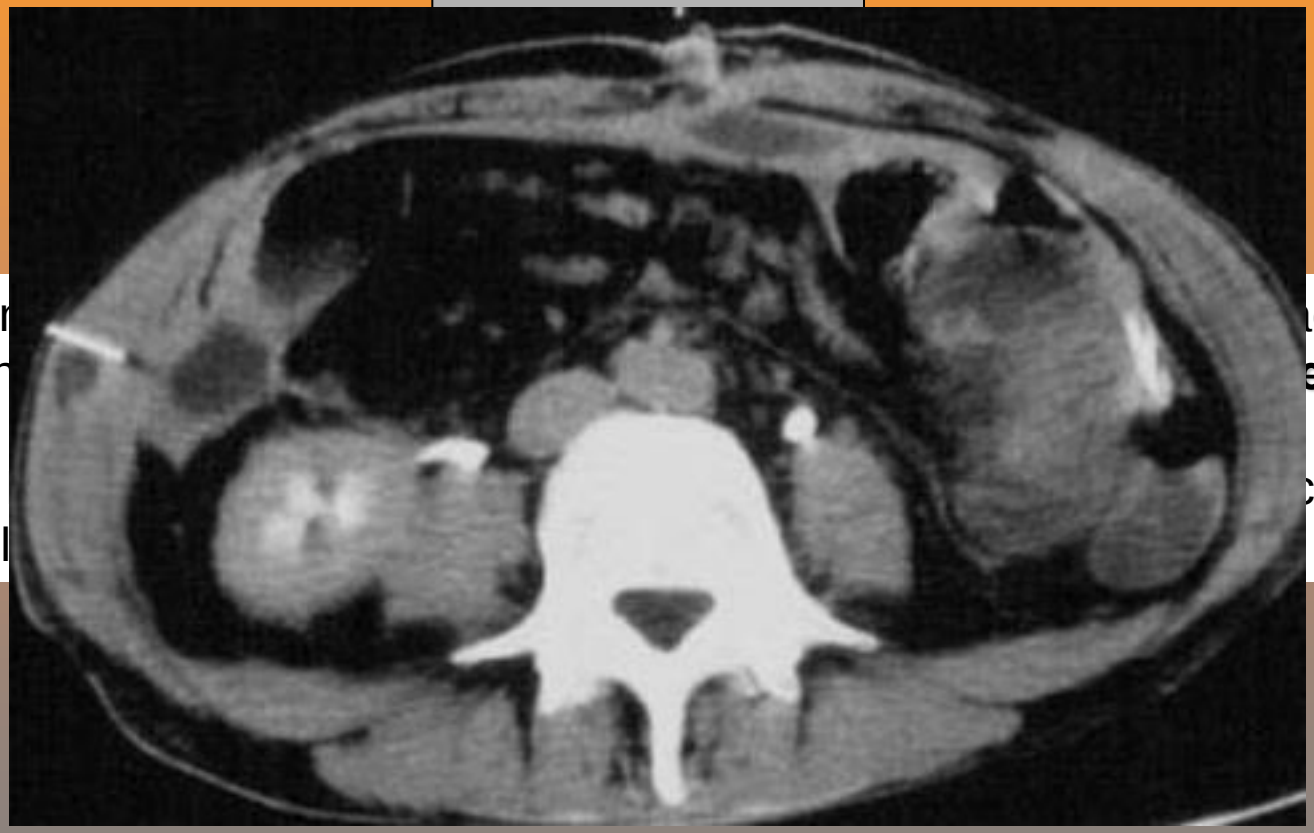
- ***diabetes: 2 points;***
- ***C-reactive protein, ≥ 100 mg/L: 1 point;***
- ***attenuation of fluid collection, ≥ 20 HU: 4 points;***
- ***entrapped gas: 3 points ;***

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

In collectio … cuate the fluid conte … e")

Therefore, … cated to treat or pall …



R. Golfieri · A. Cappelli

Computed tomography-guided percutaneous abscess drainage in coloproctology: review of the literature

Tech Coloproctol (2007) 11:197–208

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

CONTROINDICAZIONI

There are no absolute contraindications. However, there are relative contraindications and, as for all patients considered for this procedure, the relative benefits and risks of the procedure should be weighed carefully. These relative contraindications should be addressed and corrected or controlled before the procedure, when feasible. The relative contraindications for PDAFC include:

1. Significant coagulopathy that cannot be adequately corrected.
2. Severely compromised cardiopulmonary function or hemodynamic instability.
3. Lack of a safe pathway to the abscess or fluid collection.
4. Inability of the patient to cooperate with, or to be positioned for, the procedure.
5. Patient refusal of procedure.

ACR–SIR–SPR PRACTICE PARAMETER FOR SPECIFICATIONS AND PERFORMANCE OF IMAGE-GUIDED PERCUTANEOUS DRAINAGE/ASPIRATION OF ABSCESSES AND FLUID COLLECTIONS (PDAFC)

Amended 2014 (Resolution 39)*

approccio interventistico

occio interventistico

tion of Fluid Collection)

AZIONI

relative contraindications and, as for all patients
the procedure should be weighed carefully. These

1. Significant coagulopathy that cannot
2. Severely compromised cardiopulmon
3. Lack of a safe pathway to the absces
4. Inability of the patient to cooperate w
5. Patient refusal of procedure.

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

CONTROINDICAZIONI

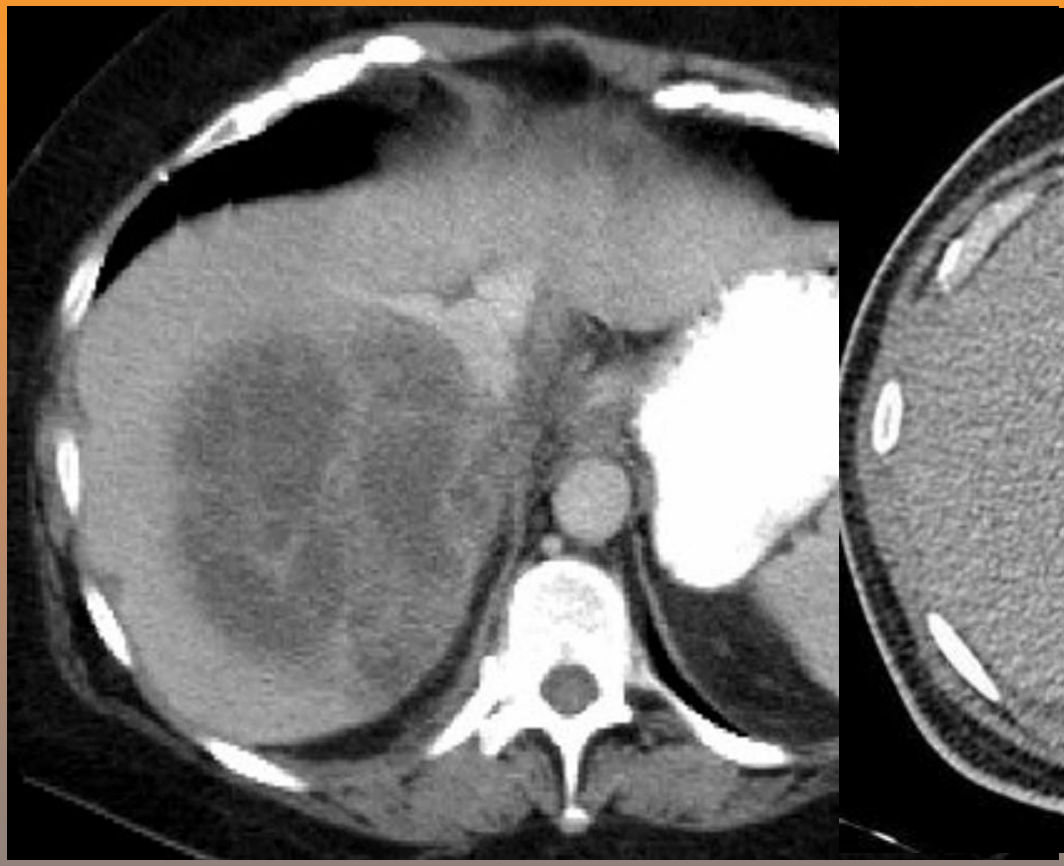
considerazioni

There is a spectrum of disease complexity. Examples of more complex situations include multiple or multiloculated abscesses, abscess due to Crohn's disease, pancreatic abscesses, a drainage route that traverses bowel or pleura, infected hematoma, and tumor abscess [17-24]. Articles have documented curative or partially successful percutaneous drainage in patients with these complex situations. However, one should expect that percutaneous drainage in such cases will have a lower chance of success, be more technically difficult, require longer periods of time for drainage, have higher likelihood of recurrence, and have a higher rate of complications.

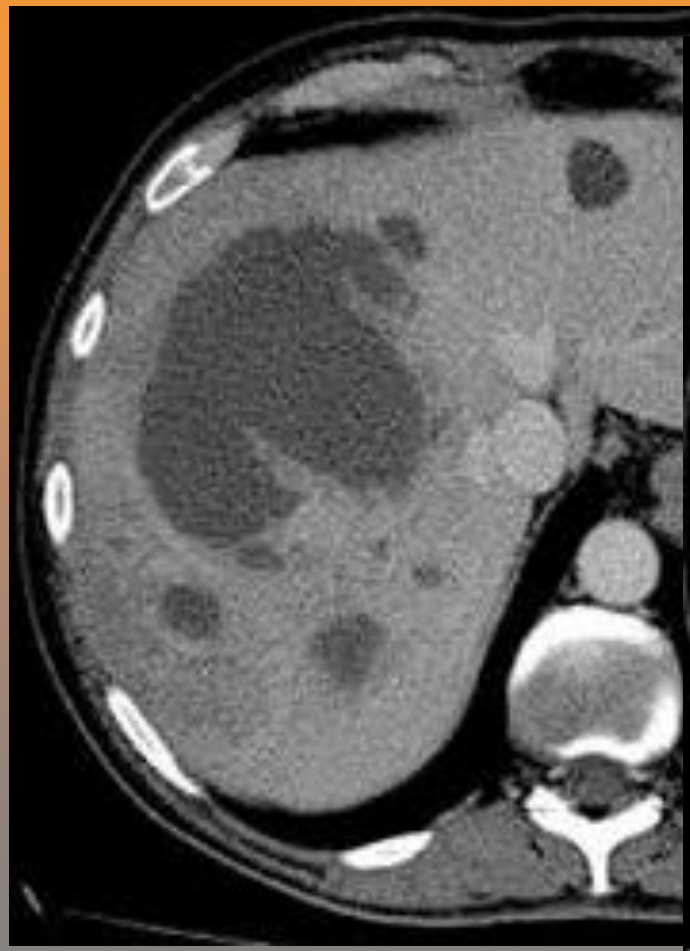
ACR–SIR–SPR PRACTICE PARAMETER FOR SPECIFICATIONS AND PERFORMANCE OF IMAGE-GUIDED PERCUTANEOUS DRAINAGE/ASPIRATION OF ABSCESSES AND FLUID COLLECTIONS (PDAFC)

Amended 2014 (Resolution 39)*

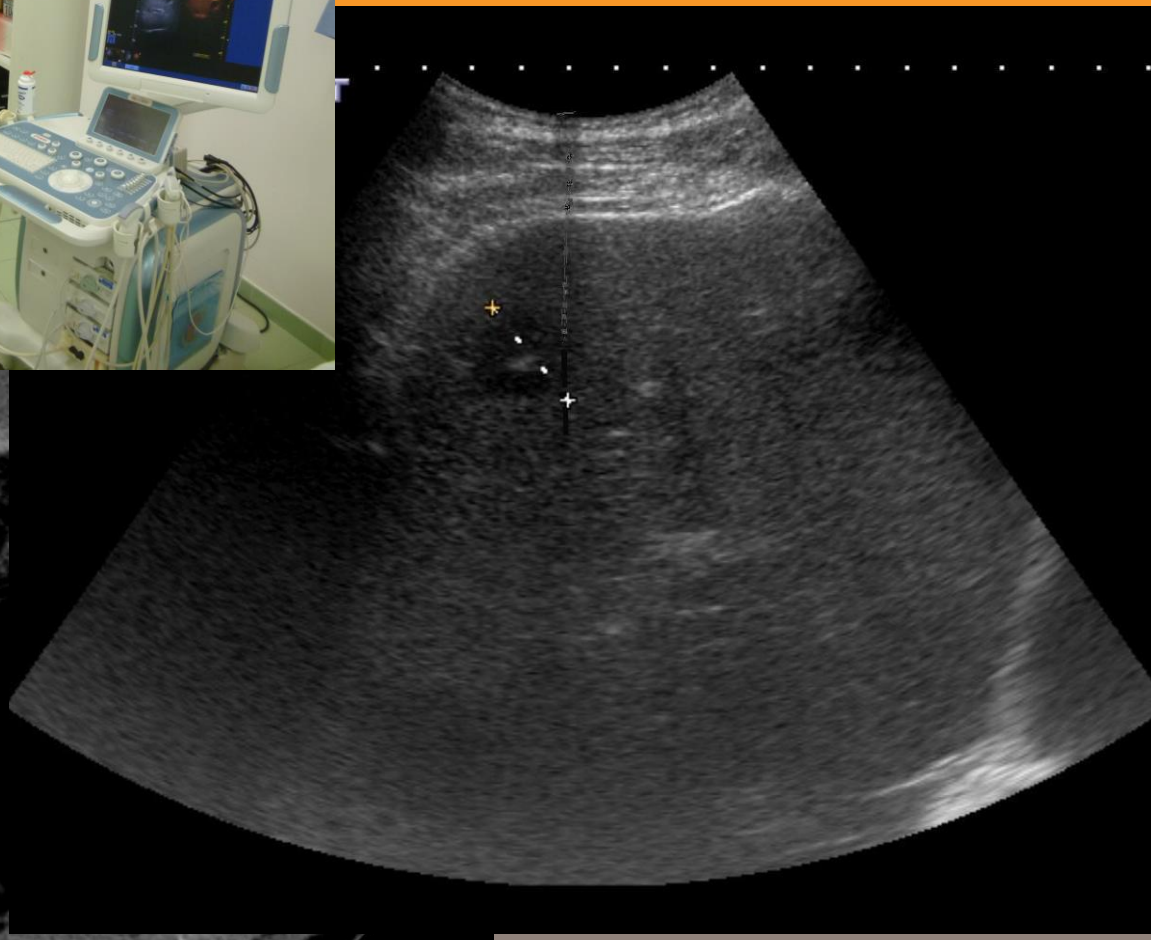
Infezioni intraddominali : approccio interventistico



Infezioni intraddominali : approccio interventistico



I occio interventistico

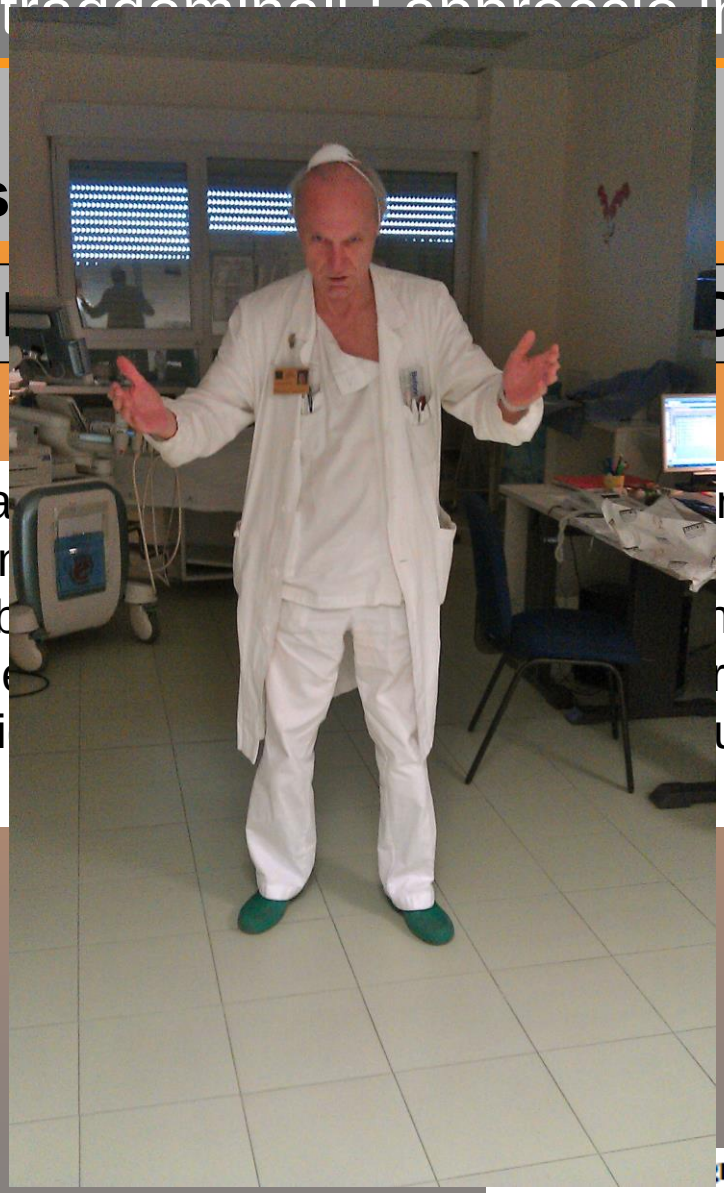


Infezioni int[illegible] interventistico

(Percutaneous [illegible] Fluid Collection)

M[illegible] C/Rx)

Selection of the most a[illegible]ng ultrasound (US), CT and fluoroscopy remain[illegible]
The choice should be b[illegible]nd operator skill; as a general rule, the most e[illegible]rating the location, extent, and relations of the flui[illegible]uld be chosen as the guidance method



R. Golfieri · A. Cappelli

[illegible]graphy-guided percutaneous abscess drainage in coloproctology: review of the literature

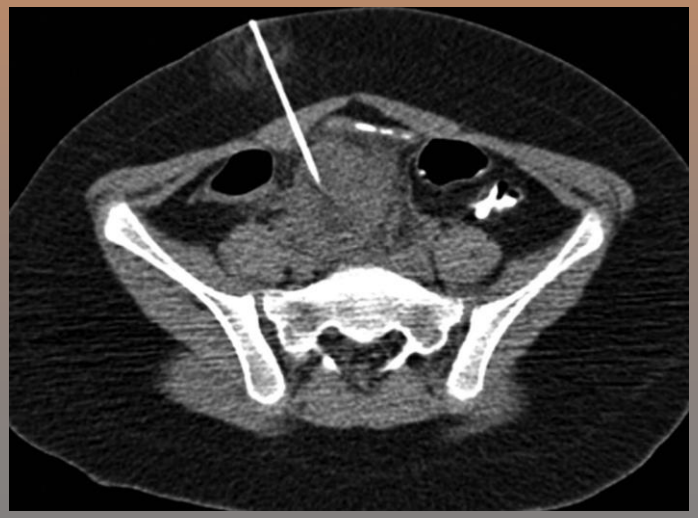
Tech Coloproctol (2007) 11:197–208

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

METODICA GUIDA (US/TC/Rx)

The most common imaging modality is CT because of its widespread use for the initial diagnosis of abdominal abscess and its superb visualization of bowel and vascular anatomy.
Ultrasonography can provide more real-time visualization during catheter insertion and can be useful when extreme angling of the route is needed.



Sheafor DH, Paulson EK, Simmons CM, DeLong DM, Nelson RC
Abdominal percutaneous interventional procedure: comparison of CT and US guidance.
Radiology 1998, 207:705–710

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

VIA DI ACCESSO

- Transaddominale anteriore
- Transaddominale laterale
- Transgluteo
- Transperineale
- Transvaginale e transrettale

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

VIA DI ACCESSO

- Transaddominale anteriore

Is still the preferred route, since it is technically the simplest, although not always practicable due to interposed bowel and other pelvic viscera
The inferior epigastric vessels, located behind the rectus abdominis muscle, should be avoided

Akinci D, Akhan O, Ozmen MN, Karabulut N, Ozkan O, Cil BE, Karcaaltincaba M Percutaneous drainage of 300 intraperitoneal abscesses wuth long-term follow-up. Cardiovasc Intervent Radiol 2005, 28:744–750

Infezioni intraddominali : approccio interventistico

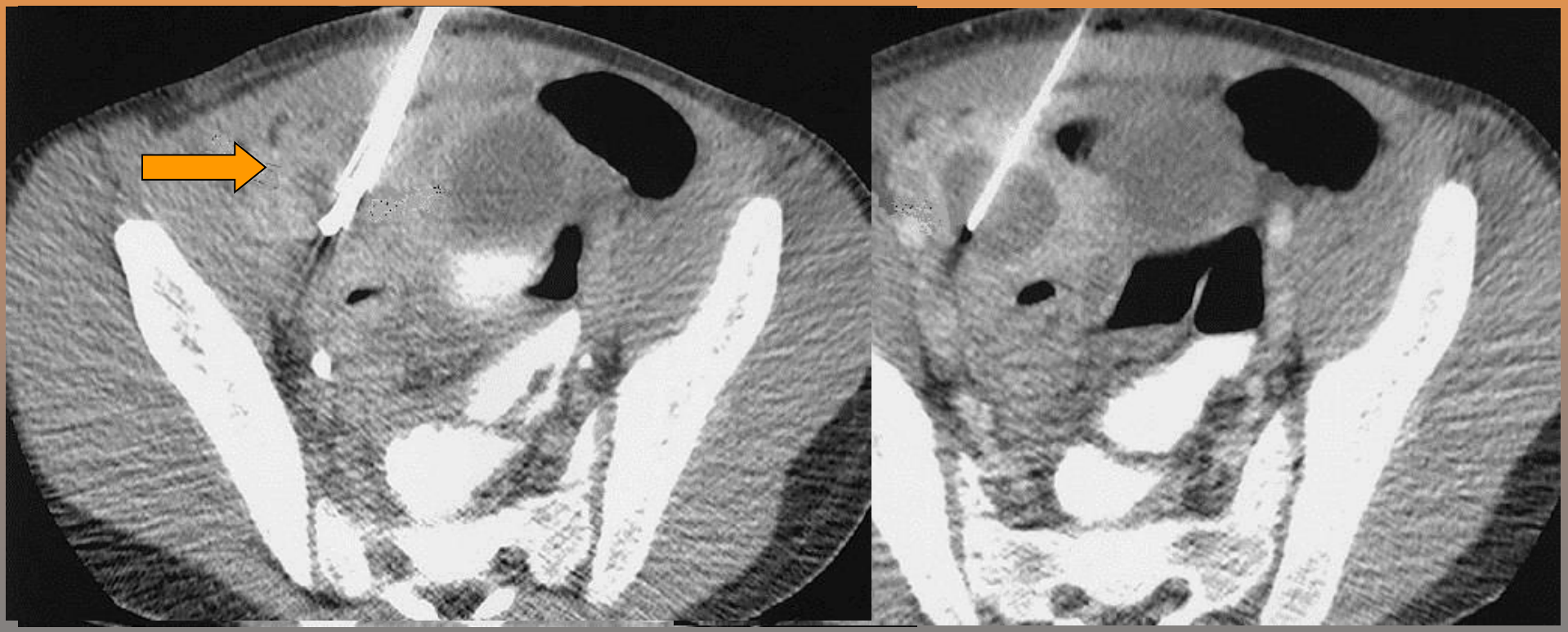
VIA DI ACCESSO

- Transaddominale anteriore

Infezioni intraddominali : approccio interventistico

VIA DI ACCESSO

- Transaddominale anteriore



Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

VIA DI ACCESSO

- Transaddominale laterale

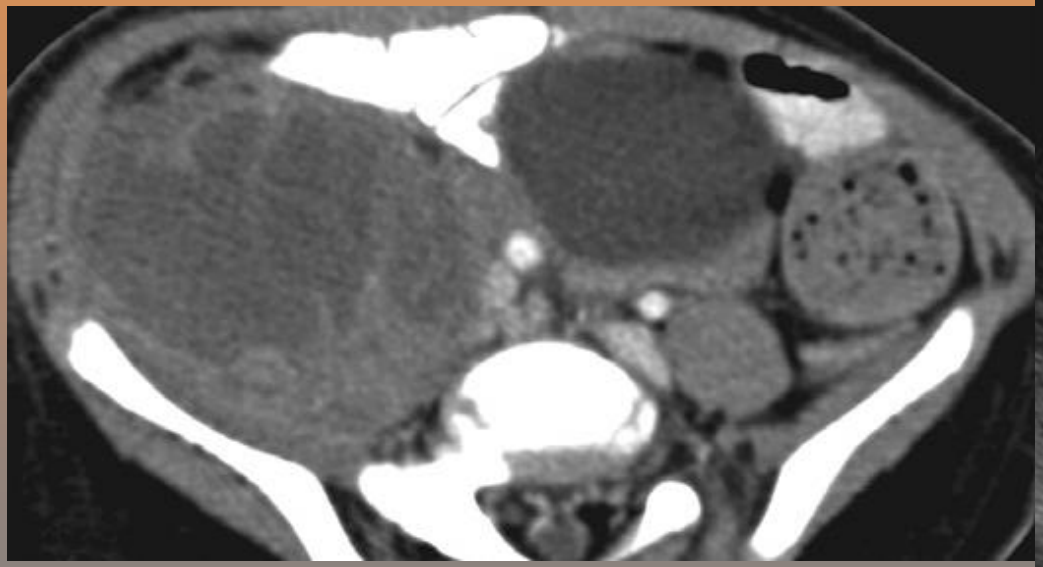
Requires identification of the deep circumflex iliac vessels situated along the anterior abdominal wall near the iliac crest

R. Golfieri · A. Cappelli
Computed tomography-guided percutaneous abscess drainage in coloproctology: review of the literature
Tech Coloproctol (2007) 11:197–208

Infezioni intraddominali : approccio interventistico

VIA DI ACCESSO

- Transaddominale laterale



Infezioni intraddominali : approccio interventistico

VIA DI ACCESSO

- Transaddominale laterale

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

VIA DI ACCESSO

- Transgluteo

The catheter should be inserted as close to the sacrum as possible at the level of the sacrospinous ligament through the piriformis muscle to avoid the sciatic nerve (situated more laterally), the gluteal vessels and the sacral plexus

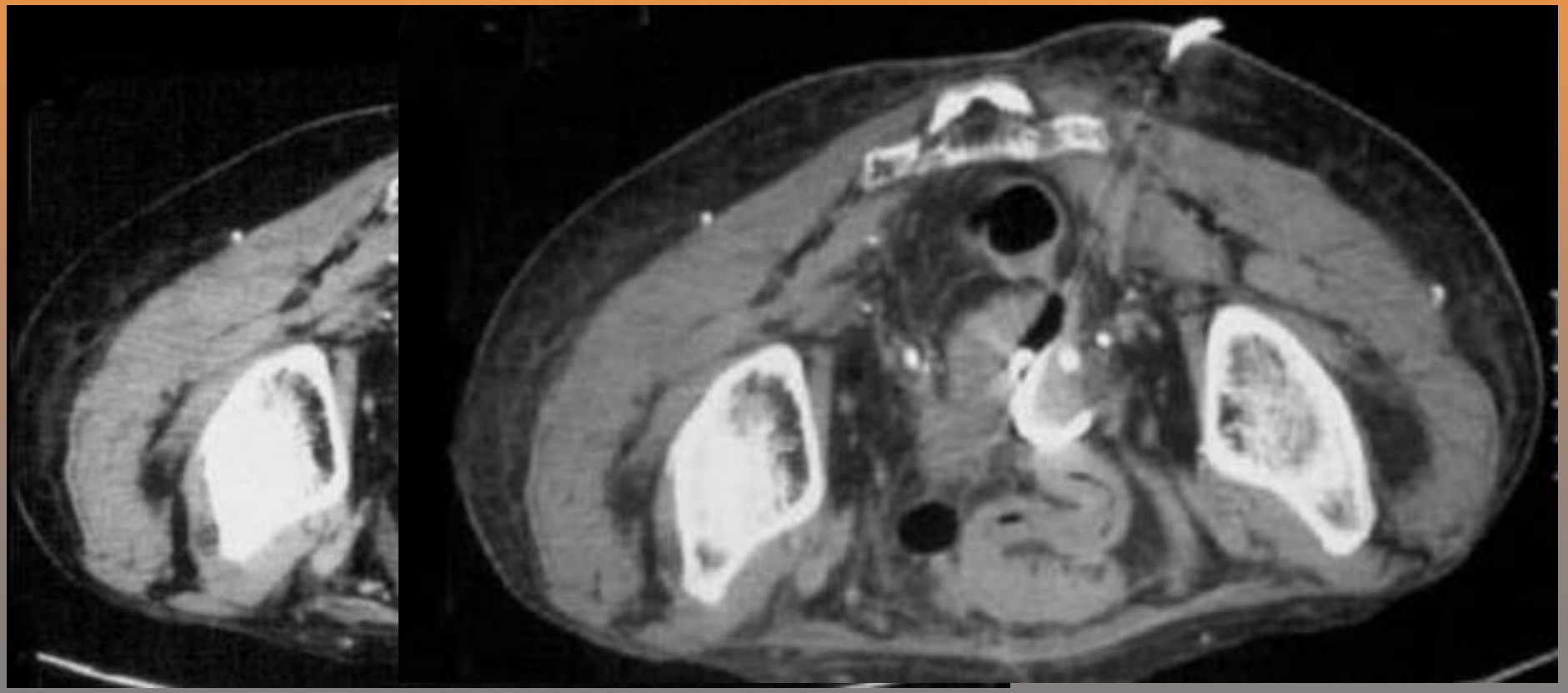
Higher incidence of pain (in approximately 20% of patients) using this approach

Harisinghani MG, Gervais DA, Maher MM et al
Transgluteal approach for percutaneous drainage of deep pelvic abscesses: 154 cases.
Radiology 2003, 228:701–705

Infezioni intraddominali : approccio interventistico

VIA DI ACCESSO

- Transgluteo



Infezioni intraddominali : approccio interventistico

VIA DI ACCESSO

- Transgluteo

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

VIA DI ACCESSO

- Transperineale

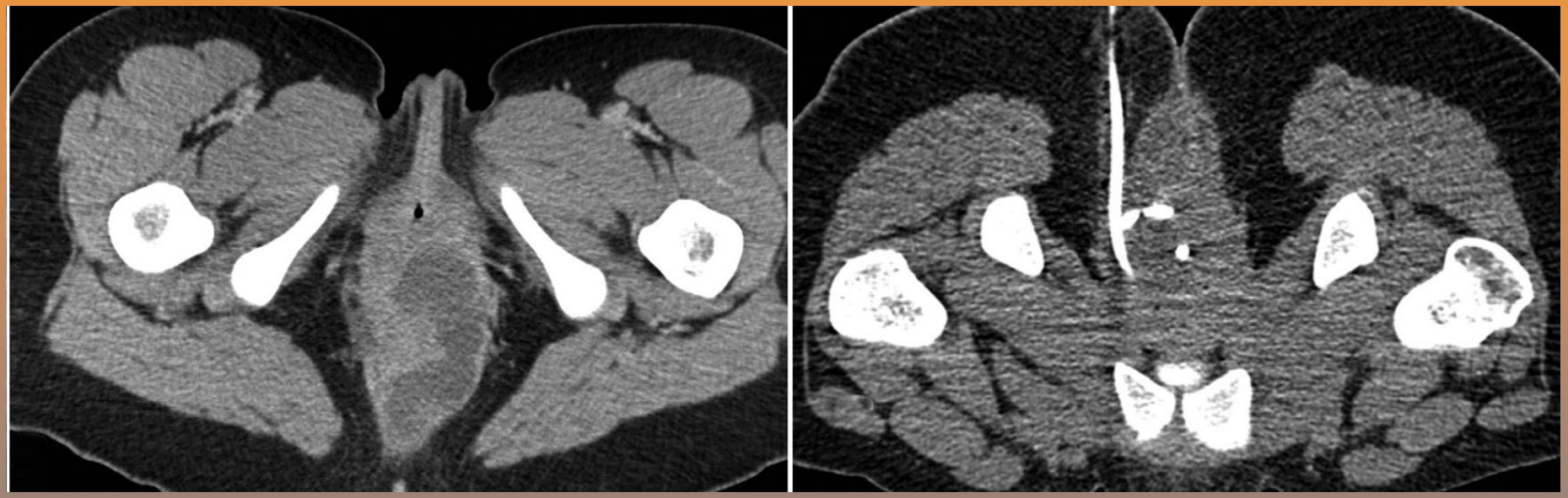
Can sometimes be used for abscesses located in the low presacral or perirectal space or perineum.
This procedure might be technically demanding and require real-time monitoring of catheter angulation under US guidance

Sperling DC, Needleman L, Eschelman DJ, Hovseplan DM, Lev-Toaff AS Deep pelvic abscesses: transperineal US-guided drainage. Radiology 1998, 208:111–115

Infezioni intraddominali : approccio interventistico

VIA DI ACCESSO

- Transperineale



Keerthi Arani1, Kiran Nandalur1, Christina M Tucker1, David A Bloom1,2

Image-guided Percutaneous Drainage in the Pediatric Population: A Primer for Radiologists

Journal of Clinical Imaging Science | Vol. 1 | Issue 2 | Apr-Jun 2011

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

VIA DI ACCESSO

- Transvaginale e transrettale

The indications for transvaginal drainage of pelvic fluid collections include both gynecologic and non-gynecologic conditions, such as simple or complex tubo-ovarian abscesses, postoperative abscesses and diverticular abscesses.

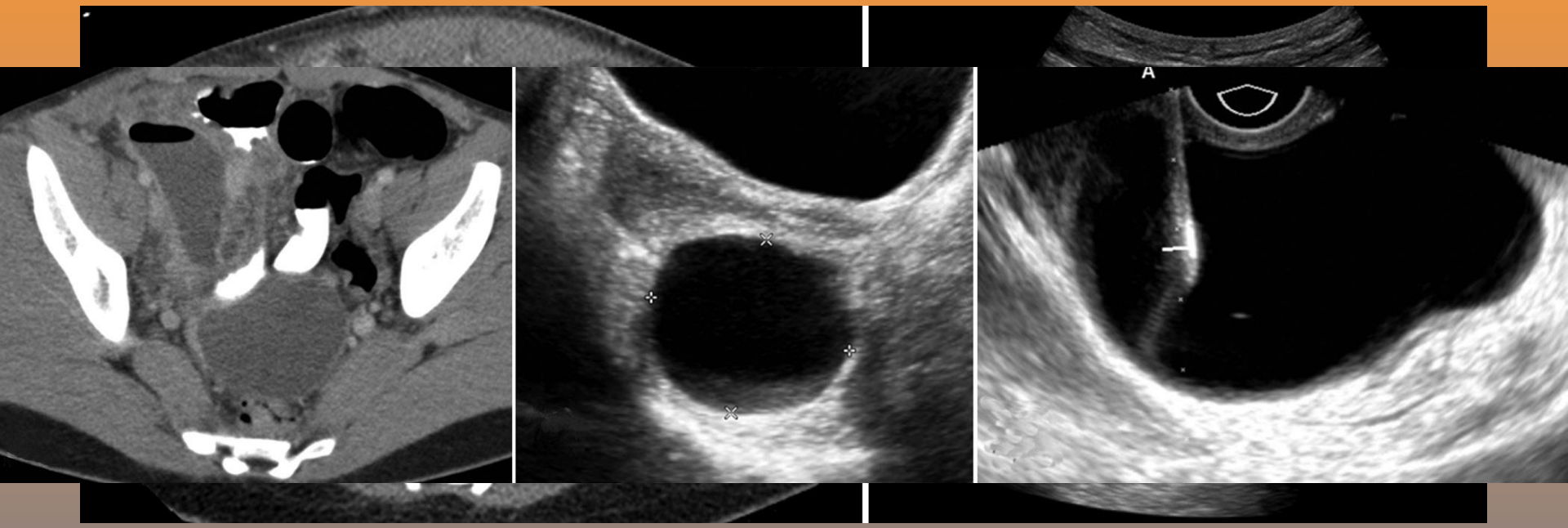
Under US guidance allow safe access to deepseated abscesses close to the vagina or rectum

Nielsen MB, Pedersen ST
Sonographically guided transrectal or transvaginal one-step catheter placement in deep pelvic and perirectal abscesses.
AJR Am J Roentegenol 2004, 183:1035–1036

Infezioni intraddominali : approccio interventistico

VIA DI ACCESSO

- Transvaginale e transrettale



Keerthi Arani1, Kiran Nandalur1, Christina M Tucker1, David A Bloom1,2

Image-guided Percutaneous Drainage in the Pediatric Population: A Primer for Radiologists

Journal of Clinical Imaging Science | Vol. 1 | Issue 2 | Apr-Jun 2011

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

TECNICA DI ESECUZIONE

- TROCAR
- SELDINGER
- TANDEM

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

- TROCAR

Is the easiest

edle-stylet +
metal stiffene

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

TECNICA DI ESECUZIONE

- SELDIN

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

TECNICA DI ESECUZIONE

- TANDEM

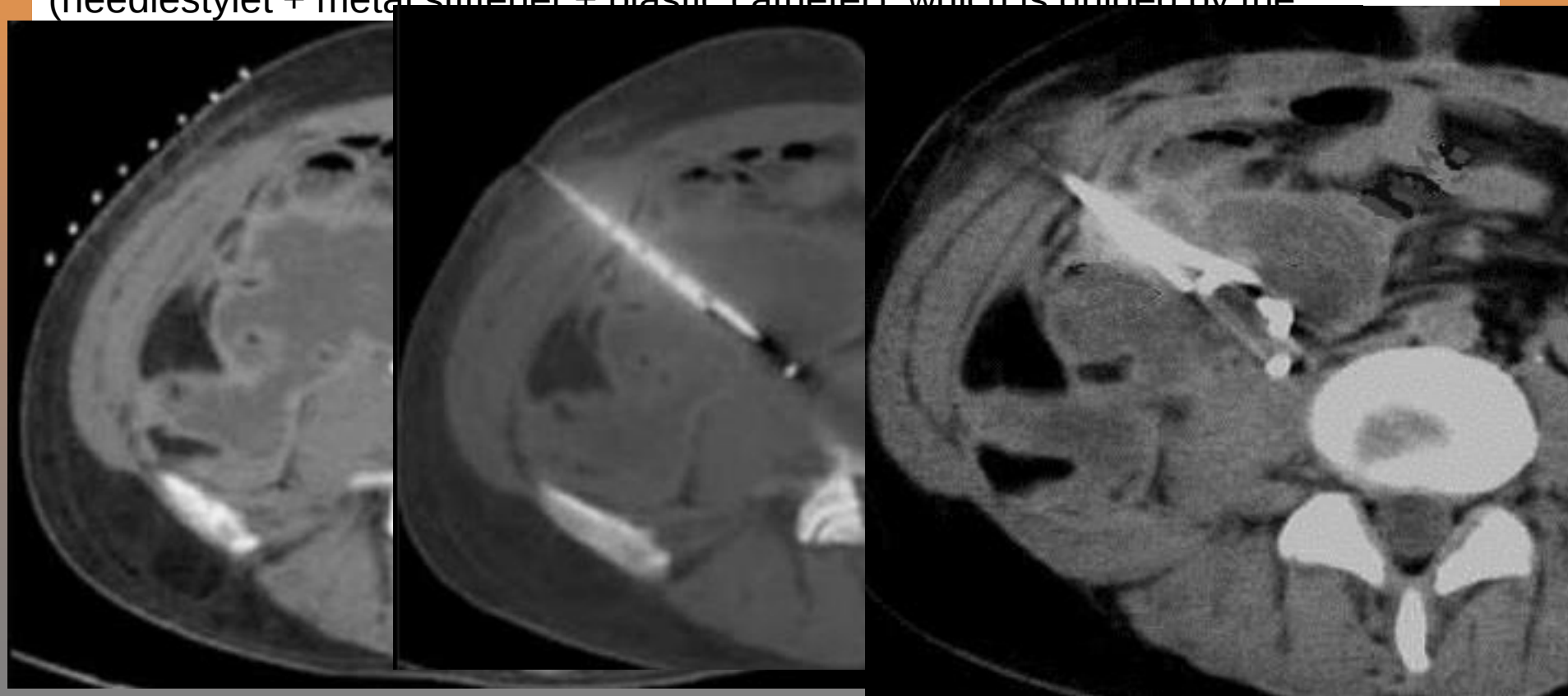
Consists of needle insertion followed by insertion of the assembled catheter (needlestylet + metal stiffener + plastic catheter), which is guided by the diagnostic needle already in place

Infezioni intraddominali : approccio interventistico

TECNICA DI ESECUZIONE

- TANDEM

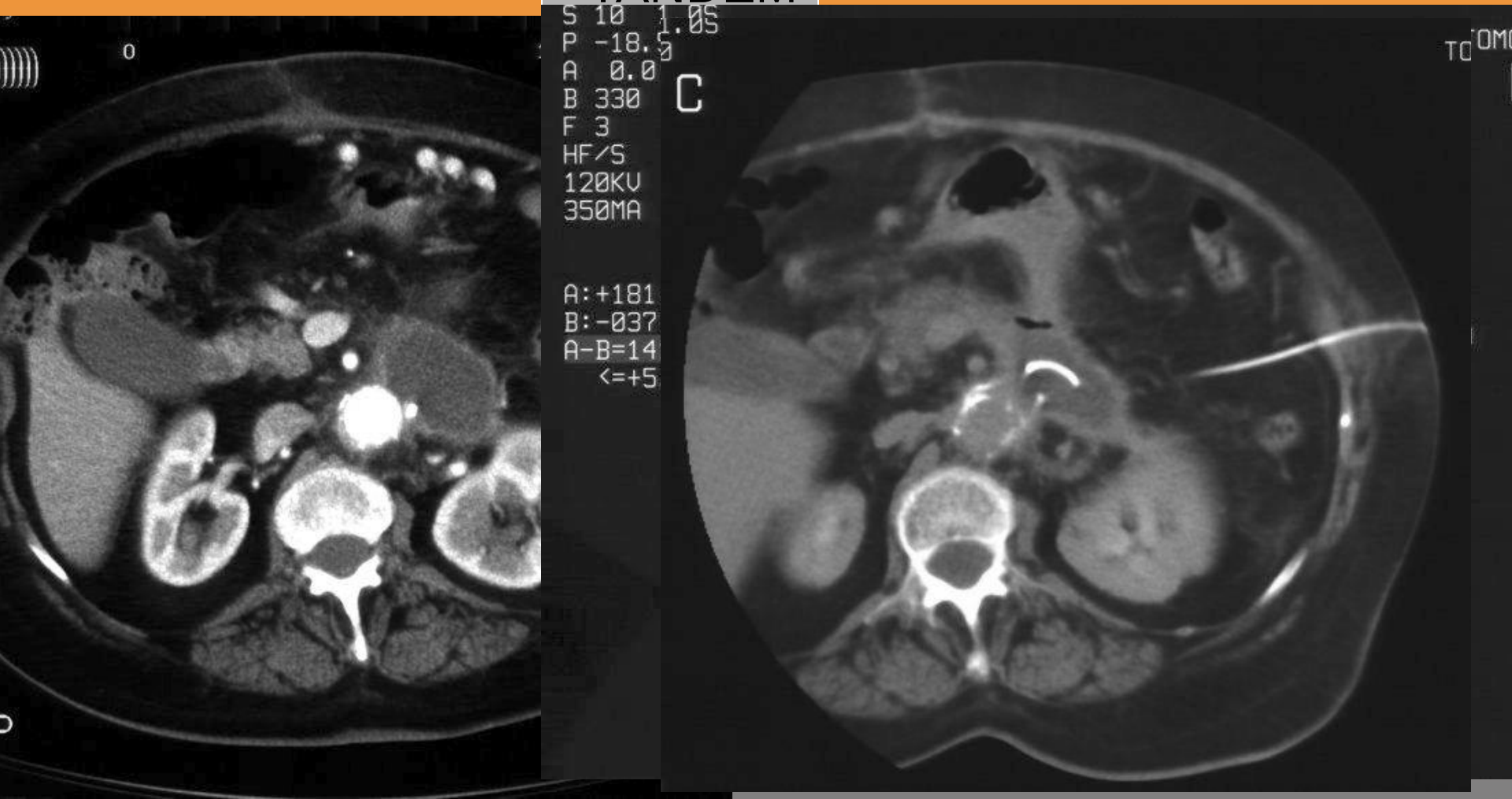
Consists of needle insertion followed by insertion of the assembled catheter (needlestylet + metal stiffener + plastic catheter), which is guided by the



Infezioni intraddominali : approccio interventistico

TECNICA DI ESECUZIONE

- TANDEM



Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

MANAGEMENT

Daily irrigation of the catheter with 10 ml saline is recommended to maintain patency, depending on the viscosity of the fluid drained

Cessation ofoutput may necessitate further imaging followed by catheter flushing, exchanging, or upsizing if a fluid collection remains.

Persistent large volumes of fluid output, output of tube feeds, or output of fecal matter may indicate a fistulous connection to an enteric structure such as stomach, small bowel, or colon. In these cases, an ‘‘abscessogram’’ under fluoroscopy may identify the fistulous connection.

Jonathan Lorenz, M.D.,[1] and Jamie Lee Thomas, D.O.[2]
Complications of Percutaneous Fluid Drainage
Semin Intervent Radiol 2006;23:194–204.

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

Jonathan Lorenz, M.D.,[1] and Jamie Lee Thomas, D.O.[2]
Complications of Percutaneous Fluid Drainage
Semin Intervent Radiol 2006;23:194–204.

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

MANAGEMENT

Although there is a lack of large-study data, groups have reported improved clinical outcomes in draining thoracic loculated empyemas when intracavitary instillation of a fibrinolytic agent is performed.
Prior in vitro analysis has demonstrated that urokinase decreases the viscosity of purulent drainage and increases flow rates for all sizes of catheters

Michael D. Beland, MD
Debra A. Gervais, MD
Diane A. Levis, PA-C
Peter F. Hahn, MD
Ronald S. Arellano, MD
Peter R. Mueller, MD

Complex Abdominal and Pelvic Abscesses: Efficacy of Adjunctive Tissue-Type Plasminogen Activator for Drainage[1]

Radiology: Volume 247: Number 2—May 2008

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

MANAGEMENT

Decisions to remove [illegible] improvement in clinical signs, decreas[illegible] per 24 hours) and imaging criteria (prog[illegible]).

R. Golfieri · A. Cappelli

Computed tomography-guided percutaneous abscess drainage in coloproctology: review of the literature

Tech Coloproctol (2007) 11:197–208

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

OUTCOME

REVIEW LETTERATURA 2007

R. Golfieri · A. Cappelli

Computed tomography-guided percutaneous abscess drainage in coloproctology: review of the literature

Tech Coloproctol (2007) 11:197–208

Table 2 Studies evaluating the percutaneous treatment of abscesses

Reference	Abscesses, *n* (patients, *n*)	Diagnosis	Access route	Guidance		Success, %	Mortality, %	Complications, %	Recurrence, % (months)	Mean drainage, days
				CT	US					
Gerzof et al. (1981) [20]	71 (67)	AA	NR	Y	Y	86	8.4	15	1 (22.3)	20.2
VanSonnenberg et al. (1982) [79]	58 (51)	AA, PA	NR	Y	Y	85	0	8.6	10.9	7
VanSonnenberg et al. (1984) [22]	250 (212)	AA	NR	Y	N	83.6	0	10.4	8	0
Mueller et al. (1984) [83]	8 (8)	IA	NR	Y	N	87.5	0	0	0	0
Mueller et al. (1985) [45]	12 (12)	PLSA	TH	Y	N	100	0	0	NR	NR
Johnson et al. (1985) [82]	23 (23)	LA	TH	Y	N	76	0	0	0	0
Jaques et al. (1986) [40]	71 (53)	AA	NR	Y	N	84	NR	NR	NR	NR
Lang et al. (1986) [80]	136 (136)	AA	NR	Y	Y	97.7	1.4	5	NR	NR
Butch et al. (1986) [62]	21 (21)	PA	TG	Y	N	81	0	0	NR	NR
Casola et al. (1987) [41]	15 (15)	CD	NR	Y	N	80	0	0	0	15
VanSonnenberg et al. (1987) [87]	21 (21)	PPA	NR	Y	N	90.4	NR	NR	NR	8
Mueller et al. (1987) [58]	24 (24)	PA	NR	Y	N	NR	NR	NR	NR	NR
Nosher et al. (1987) [76]	2 (2)	PA	TV	N	Y	100	NR	NR	NR	NR
Safrit et al. (1987) [93]	18 (10)	CD	NR	N	N	NR	NR	NR	NR	NR
Steiner et al. (1988) [84]	25 (25)	PancA	NR	Y	N	32	NR	NR	NR	NR
Lambiase et al. (1988) [94]	9 (8)	CD	NR	N	N	NR	NR	NR	NR	NR
VanSonnenberg et al. (1989) [86]	101 (101)	PancA	NR	Y	Y	90.1	0	13	0	19.6
Lang et al. (1990) [42]	33 (33)	RA	NR	N	N	NR	NR	NR	NR	NR
Tyrrel et al. (1990) [85]	8 (8)	PA	NR	Y	N	88	NR	NR	12.5 (20)	6
Gazelle et al. (1991) [66]	10 (10)	PA	TR	Y	N	100	NR	NR	NR	6.9
VanSonnenberg et al. (1991) [73]	13 (13)	PA	TV	N	Y	100	NR	NR	NR	6.7
Lambiase et al. (1992) [49]	335 (323)	AA, PA	NR	Y	Y	62.4	14.2	9.8	2.1 (3)	NR
Bennett et al. (1992) [69]	8 (8)	PA	TR	N	Y	100	NR	NR	NR	3
Casola et al. (1992) [71]	27 (16)	TOA	TV	Y	Y	94	0	11.1	7.4 (3.4)	6
Bouali et al. (1993) [23]	121 (121)	AA, RPA, PA	NR	Y	Y	NR	NR	NR	NR	NR
McGahan et al. (1996) [75]	7 (7)	PA	TV	N	Y	86	NR	NR	NR	1–3*
Sahai et al. (1997) [91]	27 (24)	CD, PA	NR	Y	N	56	0	15	NR	NR
Sperling et al. (1998) [65]	12 (12)	PA	TP	N	Y	90	NR	NR	NR	40
Marano et al. (1999) [97]	83 (83)	AA	NR	Y	N	73.5	NR	NR	NR	NR
Kim et al. (1999) [55]	23 (20)	Lymphocele	NR	Y	Y	87	0	17.3	13	22
Gervais et al. (2000) [53]	7 (7)	PA	TG	Y	N	NR	NR	NR	NR	5.6
Gervais et al. (2002) [90]	32 (32)	CD, PA	NR	Y	N	96	0	3.1	22 (7.5)	15.2
Betsch et al. (2002) [29]	75 (75)	AA	NR	Y	N	83	0	5.3	NR	14
Cinat et al. (2002) [98]	92 (92)	AA	NR	Y (80%)	Y (20%)	70	0	NR	NR	14
Khurrum Baig et al. (2002) [38]	40 (40)	AA	TP, TG	Y	N	85	0	0	35	3–20*
Benoist et al. (2004) [37]	73 (73)	AA	NR	Y	Y	81	3	0	0	0
Akinci et al. (2005) [54]	300 (255)	AA, PA	NR	Y	Y	91	NR	3.1	13	
Soyer et al. (2005) [61]	21 (21)	PA	NR	Y	N	95	0	0	NR	NR
Lee et al. (2006) [19]	24 (5 PD; 19 MT)	CD	NR	Y	Y	PD 80 MT 63.2	NR	NR	PD 12.5 (2) MT 20	NR
Kumar et al. (2005) [39]	114 (53 PD; 61 MT)	AA	NR	Y	Y	PD 86 MT 59	NR	NR	0 0	NR
Brandt et al. (2006) [30]	66 (34 PD; 32 MT)	AA	TP, TG	Y	N	PD 67 MT 81.3	PD 8.8 MT 3.1	PD 32.3 MT 18.7	PD 29.4 MT 15.6	8
Mehendiratta et al. (2007) [99]	92 (92)	AA, PA	NR	Y	N	73	9	NR	NR	NR
Neufel et al. (2006) [95]	17 (13)	CD, AA	NR	Y	N	NR	NR	NR	NR	NR
Golfieri et al. (2006) [96]	87 (87)	PA	NR	Y	N	85	0	0	12.6 (6)	10.5

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

OUTCOME

Table 1 Studies comparing CT-guided PAD to surgical drainage

Reference	Patients, *n*		Success rate, %		Mortality, %	
	Percutaneous drainage	Surgical drainage	Percutaneous drainage	Surgical drainage	Percutaneous drainage	Surgical drainage
Johnson et al. (1981) [8]	27	43	89	70	11	21
Halasz, van Sonnemberg (1983) [9]	11	19	NR	NR	9	16
Aeder et al. (1983) [10]	13	32	69	NR	23	37
Brolin et al. (1984) [11]	24	24	92	88	0	13
Glass, Cohn (1984) [12]	15	44	47	88	NR	NR
Olak et al. (1986) [2]	27	27	70	85	11	7
Lurie et al. (1987) [13]	29	60	80	81	17	17
Malangoni et al. (1990) [14]	18	30	61	53	11	27
Hemming et al. (1991) [3]	42	41	93	96	12	14
Levison, Zeigler (1991) [15]	57	54	47	54	29	29
Lang et al. (1991) [4]	41	41	NR	NR	16	33
Bufalari et al. (1996) [6]	27	10	NR	NR	11	20
Ayuk et al. (1996) [17]	14	30	37.5	76.7	NR	NR
Giangreco et al. (1997) [5]	32	39	72.7	62.5	7	NR
Jawhari et al (1998) [18]	15	28	26.6	NR	NR	NR
Garcia et al. (2001) [16]	18	30	61	53	11	27
Guiterrez et al. (2006) [7]	37	29	75.6	82.7	0	0

NR, not reported

REVIEW LETTERATURA 2007

R. Golfieri · A. Cappelli

Computed tomography-guided percutaneous abscess drainage in coloproctology: review of the literature

Tech Coloproctol (2007) 11:197–208

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

OUTCOME

The success rate in abdominal abscess (i.e. resolution of the collection) is high (~90%) under favorable conditions such as: lesions situated in the periphery of the abdomen, uncomplicated access routes through the abdominal wall, homogeneous fluid collections in undivided or communicating spaces, and etiology of postoperative complications without a primary intra-abdominal disease

REVIEW LETTERATURA 2007

R. Golfieri · A. Cappelli

Computed tomography-guided percutaneous abscess drainage in coloproctology: review of the literature

Tech Coloproctol (2007) 11:197–208

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

OUTCOME

STANDARD DI SUCCESSO ATTESO

Successful diagnostic fluid aspiration is defined as the aspiration of material sufficient for diagnosis

The suggested threshold for aspiration of adequate fluid for diagnostic characterization is 95%.

ACR–SIR–SPR PRACTICE PARAMETER FOR SPECIFICATIONS AND PERFORMANCE OF IMAGE-GUIDED PERCUTANEOUS DRAINAGE/ASPIRATION OF ABSCESSES AND FLUID COLLECTIONS (PDAFC)

Amended 2014 (Resolution 39)*

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

OUTCOME

STANDARD DI SUCCESSO ATTESO

Curative drainage is defined as complete resolution of infection requiring no further operative intervention. Curative drainage has been achieved in more than 80% of patients.

Partial success is defined as either adequate drainage of the abscess with surgery subsequently performed to repair an underlying problem or as temporizing drainage performed to stabilize the patient's condition before surgery. Partial success occurs in 5%–10% of patients.

Failure occurs in 5%–10% and recurrence in 5%–10%.

ACR–SIR–SPR PRACTICE PARAMETER FOR SPECIFICATIONS AND PERFORMANCE OF IMAGE-GUIDED PERCUTANEOUS DRAINAGE/ASPIRATION OF ABSCESSES AND FLUID COLLECTIONS (PDAFC)

Amended 2014 (Resolution 39)*

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

OUTCOME

STANDARD DI SUCCESSO ATTESO

(PDAFC)

Amended 2014 (Resolution 39)*

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

OUTCOME

STANDARD DI SUCCESSO ATTESO

Table 1
Success Rates and Thresholds

Outcome	Suggested Threshold (%)
Drainage of infected collections: Due to the variability of the types of infected collections, the success rate of drainage will be highly variable and it is not believed that a specific threshold for success can be set.	
Successful drainage	
Curative and partial success	85

ACR–SIR–SPR PRACTICE PARAMETER FOR SPECIFICATIONS AND PERFORMANCE OF IMAGE-GUIDED PERCUTANEOUS DRAINAGE/ASPIRATION OF ABSCESSES AND FLUID COLLECTIONS (PDAFC)

Amended 2014 (Resolution 39)*

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

OUTCOME

FATTORI CHE INFLUENZANO IL SUCCESSO

Failure of PAD is described in 8%–30% of cases and is related to the presence of loculations,phlegmon, immature abscess membrane, wide associated fistula, improper catheter position, and premature catheter removal.

Predictors of unsuccessful outcome of PAD are: abscesses caused by internal fistulas, multiloculated and multiple abscesses, pancreatic involvement by abscesses, infected clots impossible to drain, advanced age, high APACHE II score and malnutrition

REVIEW LETTERATURA 2007

R. Golfieri · A. Cappelli

Computed tomography-guided percutaneous abscess drainage in coloproctology: review of the literature

Tech Coloproctol (2007) 11:197–208

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

OUTCOME

FATTORI CHE INFLUENZANO IL SUCCESSO

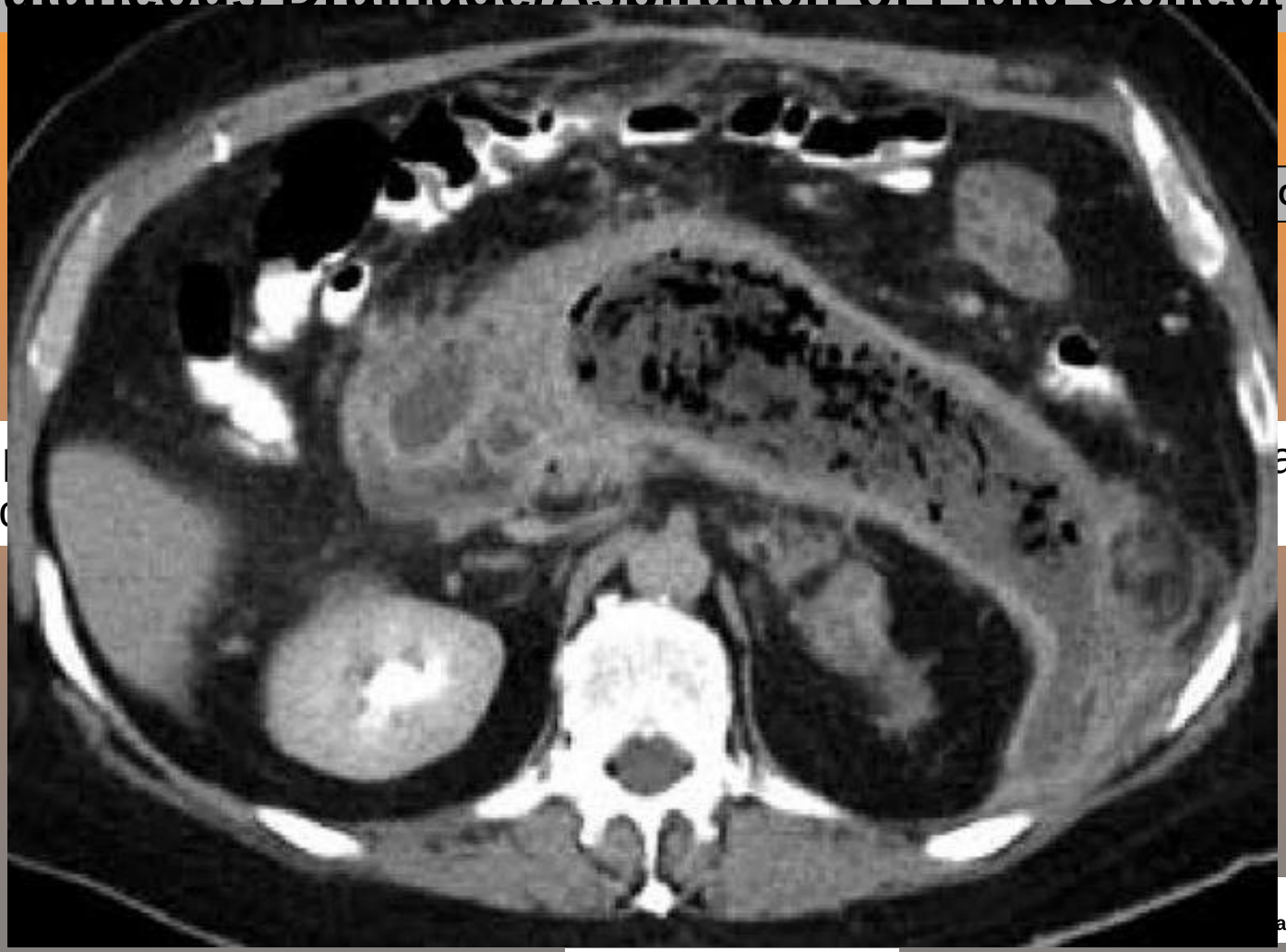
Negative predictors of successful outcome included the presence of yeast and pancreatic origin

M. Cinar, S. E. Wilson, A. M. Din
Determinants for Successful Percutaneous Image-Guided Drainage of Intra-abdominal Abscess

ARCH SURG 2002, 137; 845-849

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)



CCESSO

Negative
pancreatic
and

a-abdominal Abscess

ARCH SURG 2002, 137; 845-849

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

COMPLICANZE

Complications of PAD occur in 8%–10% of cases.

Mortality at 30 days ranges from 1% to 6% and puncture-related mortality is around 0.7% .

Major complications have been described in 5%–11% of cases and include septicemia (with associated disseminated intravascular coagulation or hypotension), small bowel fistula with colon perforation, and death (due to sepsis or hemorrhage).

Minor complications, such as bacteremia, catheter back bleeding and entry-site skin infection, occur in around 3% of cases.

REVIEW LETTERATURA 2007

R. Golfieri · A. Cappelli

Computed tomography-guided percutaneous abscess drainage in coloproctology: review of the literature

Tech Coloproctol (2007) 11:197–208

Infezioni intraddominali : approccio interventistico

PDAFC
(Percutaneous Drainage/Aspiration of Fluid Collection)

COMPLICANZE

Complications for percutaneous drainage are reported to occur in approximately 10% of patients

Table 2
Published Complication Rates and Suggested Thresholds

Specific Major Complication	Reported Rate (%)	Suggested Threshold (%)
Septic shock	1–2	4
Bacteremia requiring significant new intervention	2–5	10
Hemorrhage requiring transfusion	1	2
Superinfection (includes infection of sterile fluid collection)	1	2
Bowel transgression requiring intervention	1	2
Pleural transgression requiring intervention (abdominal interventions)	1	2

ACR–SIR–SPR PRACTICE PARAMETER FOR SPECIFICATIONS AND PERFORMANCE OF IMAGE-GUIDED PERCUTANEOUS DRAINAGE/ASPIRATION OF ABSCESSES AND FLUID COLLECTIONS (PDAFC)

Amended 2014 (Resolution 39)*

CONCLUSIONI

1. Ochsner A, DeBakey M. Subphrenic abscess: a collective review and an analysis of 3,608 collected and personal cases. *Int Abstr Surg* 1938; 66:426–438

Gerant Rivera-Sanfeliz
Percutaneous Abdominal Abscess Drainage: A Historical Perspective
AJR 2008; 191:642–643

Imaging delle infezioni intraddominali : approccio interventistico

Roberto Galeotti

GRAZIE PER L'ATTENZIONE