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Review article

What type of imaging work-up will help to confirm the diagnosis of gossypiboma in the limb? Review of literature

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ABSTRACT

Gossypiboma imaging features are not well known and are often confused with soft tissue tumours. Publications on this topic mainly consist of case reports and small cohorts. Its appearance on various imaging modalities is not well defined. This led us to carry out a review of literature to determine specifically: (1) which imaging modalities should be used in cases of suspected gossypiboma, (2) what are the most common imaging findings that contribute to the diagnosis of gossypiboma. An exhaustive review of literature was carried out in June 2015 in the Medline, PubMed and Cochrane databases using the keywords "gossypiboma/textiloma/foreign body". We found 205 articles describing one or multiple cases of gossypiboma in various locations. Of these, the 32 articles that had imaging data were chosen — 16 for the limbs and 16 for other locations. The type of imaging carried out, description of the gossypiboma and circumstances of the discovery and occurrence were recorded. Descriptive statistics were generated to define the type of imaging used and the various findings. Imaging consisted of X-rays in 21/32 cases (66%), computed tomography (CT) in 14/32 cases (43%), magnetic resonance imaging (MRI) in 21/32 cases (65%) and ultrasonography in 14/32 cases (43%). On X-rays, bone involvement was found in 9/15 cases (60%); there was peripheral contrast product uptake on the CT scans in 9/14 cases (64%), a hypointense signal on T1-weighted sequences on MRI in 6/13 cases (46%) and lack of vascularisation in 8/13 cases (62%) and a acoustic shadow on ultrasonography in 9/14 cases (64%). In a patient presenting with a soft tissue lump and history of surgery, an imaging work-up including X-rays, ultrasonography and MRI must be performed. Bone involvement on X-rays, acoustic shadowing on ultrasonography and hypointense signal on T1-weighted MRI sequences with lack of vascularisation in combination with a history of surgery can bring up the possibility of gossypiboma. If there is a possibility of soft tissue tumour, the case should be discussed in a multidisciplinary meeting and a biopsy should be performed first.
Level of evidence: IV – systematic analysis of published retrospective studies.

1. Introduction

In rare instances in orthopaedic surgery, a compress or woven drape is forgotten intra-operatively. A more common complication in non-scheduled surgery [1], gossypiboma of the limbs can be asymptomatic for more than 10 years. A reactional mass around the cotton item, called gossypiboma or textiloma, most often has several signs of malignancy on magnetic resonance imaging (MRI) [2]. A soft tissue tumour is often suspected, but the treatment is not the same.

The imaging features of gossypiboma are not well-described or well known; the literature mostly consists of clinical cases [3–5]. Few studies have reported consistent imaging findings that could help us make a reliable gossypiboma diagnosis. Patient care can be improved by taking into consideration the possibility of gossypiboma in patients with a history of surgery and knowing how it appears on various imaging modalities.

This led us to analyse the literature to define specifically:

- which imaging modalities should be used in cases of suspected gossypiboma;
- what are the most common features of gossypiboma on these imaging modalities that could help orient the diagnosis.

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2. Material and methods

2.1. Search strategy and criteria

A systemic review of literature was carried out in June 2015 in the Medline, PubMed and Cochrane databases by the first and last authors with no limit on publication date. The keywords were "gossypiboma/textiloma/foreign body".

2.2. Extraction method

Two hundred five articles were identified and classified according to the location of the gossypiboma. Twenty-nine could not be classified and 12 related to gossypiboma prevention and epidemiology but not imaging. This resulted in 174 candidate articles, with 19 of them in the limbs (Fig. 1). Three were excluded because the abstract or article were not available. For each location, the articles considered as having the highest power were selected (sample size, precise description of imaging and confirmed gossypiboma diagnosis). The 32 chosen articles were read in their entirety, along with the reference list to make sure that articles pertaining to the study questions were not forgotten (Fig. 1). For each article, the imaging modality used and the imaging findings were recorded in two tables. One of the tables pertained to the limbs and the other to all other locations.

2.3. Statistical methods

Descriptive statistics (proportions and percentages) were generated to determine the distribution of the imaging modality and imaging findings. The number studied was divided by the total to determine its proportion.

3. Results

3.1. Imaging work-up performed in cases of suspected gossypiboma

Standard X-rays were performed in 21 of 32 cases (66%), with 15 of 16 cases (93%) in the limbs and 6 of 16 cases (37%) in other locations (Tables 1 and 2). This made it possible to identify the outline of the compress in 5 of 32 cases (15%). A CT scan was carried out in 14 of 32 cases (43%), with 3 of 16 cases (18%) in the limbs and 11 of 16 cases (68%) in other locations. An MRI was performed in 21 of 32 cases (66%), with 13 of 16 cases (81%) at the limbs and 8 of 16 cases (50%) in other locations. Ultrasonography was performed in 14 of 32 cases (43%), with 4 of 16 cases (25%) at the limbs and 10 of 16 cases (62%) in other locations. The diagnosis of gossypiboma was made in 2 of 16 cases (12%) in the limbs and 14 of 16 cases (87%) in other locations.

3.2. Common imaging findings of gossypiboma that help orient diagnosis

The X-rays showed bone involvement, ranging from simple remodelling to pathological fracture in 9 of 15 cases (60%) where X-rays were performed on the limbs (Table 3). CT revealed peripheral uptake of iodinated contrast product in 9 of 14 cases (64%), with 2 of 3 cases (66%) at the limbs and 7 of 11 cases (63%) in other locations. MRI detected a hypointense signal on T1-weighted images associated with a heterogeneous signal on T2-weighted images in 6 of 13 cases (46%) and lack of vascularisation in 8 of 13 cases (62%) at the limbs. Ultrasonography found an acoustic shadow in 9 of 14 cases (64%), with 1 of 4 cases (25%) at the limbs and 8 of 10 cases (80%) in the other locations.

4. Discussion

Gossypiboma occurs when a compress or woven drape is unintentionally left in the patient during a surgical procedure. This is a rare complication: the incidence is between 1/100 and 1/3000 for all procedures combined [3]. It is more frequent in gastrointestinal surgery, with an incidence between 1/1000 and 1/1500 [3] and in an emergency surgery context [1]. The typical diagnosis is that of soft tissue tumour [4] or infectious fluid accumulation [5]. The features of gossypiboma on imaging modalities are not well known and poorly defined. The literature mainly consists of case reports and a few small cohort studies that are insufficient to generate consistent descriptions. The clinical cases often pertain the limbs [2,6–20] and a few cohort studies were identified that pertained to other locations [4,5,22,27–29].

The current study has several limitations:

- heterogeneity of studies and cases, with each situation being different. But our study is the first review on this topic; a meta-analysis was not possible because of the lack of comparative studies;
- the diagnostic and treatment procedures change depending on the presumed diagnosis, ranging for simple excision to biopsy and clean-margin tumour excision, a more extensive procedure that makes the patient anxious. Gossypibomas manifest themselves as a painful lump, with time having no effect on pain [6,7]. Gossypibomas located in the abdomen or pelvis lead to more complications (blockage, fistula, etc.) than those in limbs that are asymptomatic over many years [8]. As a consequence, the strong diagnostic suspicion is based only on the clinical examination, which can be highly variable. Properly conducted imaging work-up and correct interpretation contributes much more to the diagnosis;
- the small number of cases, since the published case reports of gossypiboma in the limbs only reported one case each. However, our work is the first review of this topic and will help to increase the accuracy of the description;
- the descriptions were incomplete in some cases and the imaging not very precise. To address this, the articles were analysed by two authors to extract as much data possible from them;
- this was a review of retrospective studies, resulting in a descriptive study with no statistical power.

The imaging work-up in cases of suspected gossypiboma must include radiographs, MRI with contrast and ultrasonography at a minimum. CT (even with contrast) does not contribute anything beyond MRI. Ultrasonography is rarely performed in the limbs (25%), but it has a contribution with 87% of suspected gossypiboma in other locations where it is used more (62%). PET scans and bone scans are not sensitive or specific enough in this context [8,20].

The most common imaging findings in cases of gossypiboma are bone involvement in 65% of cases on X-rays, an ultrasonography acoustic shadow in 64% of cases, hypointense signal on T1-weighted MRI sequences in 46% of cases and hypovascularisation of the mass in 62% of cases on MRI.

Iwase et al. [6] described a case considered as a pseudoaneurysm for which preoperative embolisation was performed. Vascularisation of the mass was revealed when the contrast product was injected. Perilesional inflammation stimulates peripheral vascularisation visible on CT [13] and generates metabolism similar to tumours [34]. Histological studies have mainly found giant cells, granulomas and fibroblasts in this inflammatory cluster [34].

Acoustic shadowing on ultrasound images is highly suggestive of gossypiboma, but must be confirmed on X-rays to rule out the presence of calcification that also produces acoustic shadowing on ultrasonography [35]. Wan et al. [23] performed in vitro

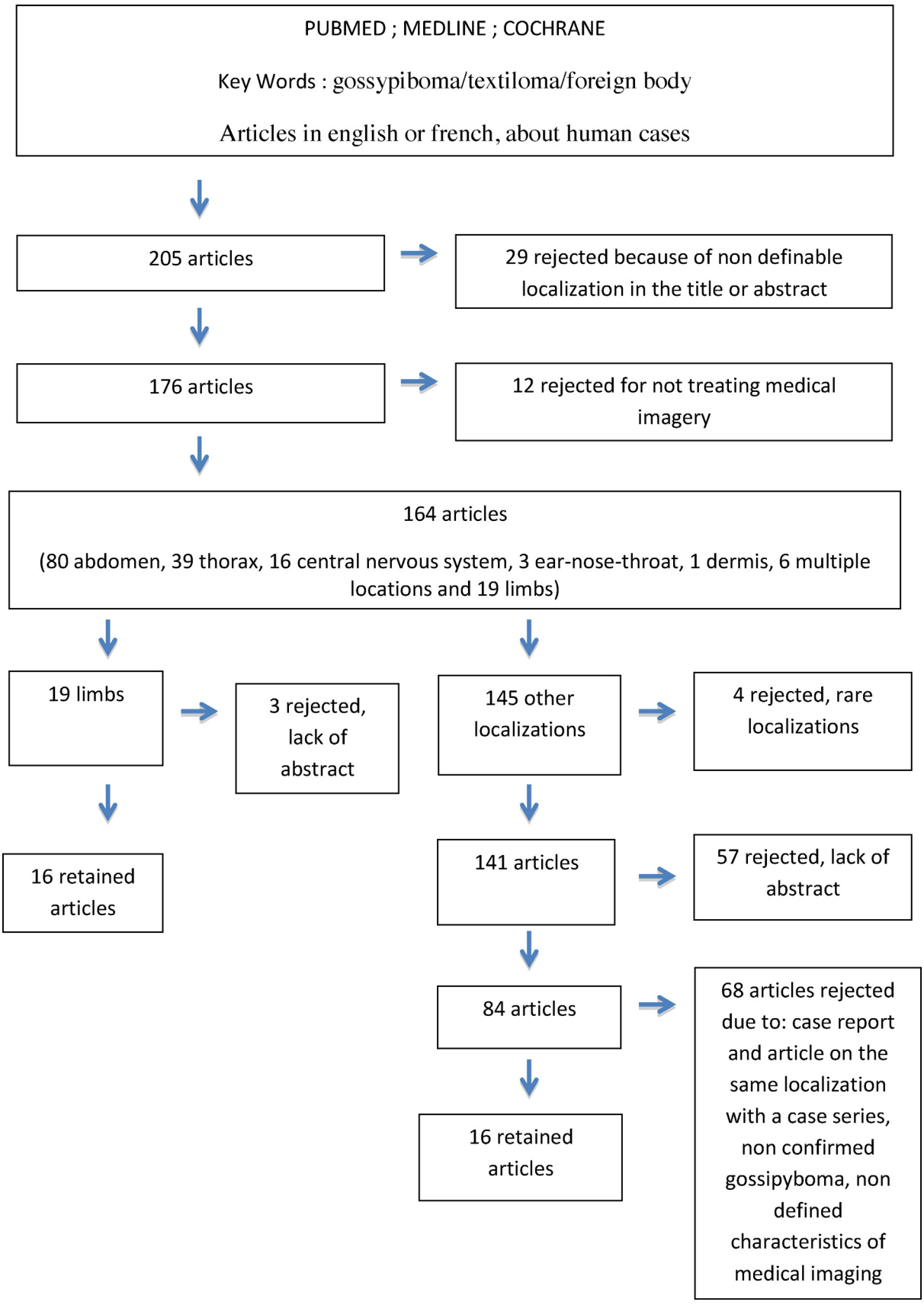

Fig. 1. Flow chart summarizing the selection of articles from the review of literature on gossypiboma imaging.

Table 1
Review of literature for limb gossypibomas (1992–2013) identified 16 articles (clinical case, 1 case).

Reference	Initial surgery	Time (years)	Clinical presentation	X-rays	US	CT (with contrast)	MRI (T1-T2-gadolinium)	Assumed diagnosis	Procedure
Iwase et al. [6]	Bipolar hip arthroplasty	12	Painful lump	Opacity w/o bone involvement	None	Higher uptake	T1 hyposignal, T2 heterogeneous, G uptake	Pseudoaneurysm (preoperative embolization)	Excision and prosthesis revision
Bevernage et al. [7]	Repair of glenoid labrum	1.5	Mass	Outlining of compress	Abscess	None	None	Gossypiboma	Excision
Sakayama et al. [8]	Femur external fixator	40	Painless lump	Opacity, periosteal reaction, osteolysis	None	Calcification, heterogeneous, peripheral uptake	T1 isosignal, T2 heterogeneous, peripheral G uptake	Chondrosarcoma	Biopsy then cancer excision
Puri et al. [9]	DHS femur	13	Painful lump	Opacity, bone remodelling	None	None	T1 hyposignal, T2 heterogeneous	Sarcoma	Biopsy then cancer excision
Kominami et al. [10]	Femur external fixator	UK	Painful lump	Opacity, periosteal reaction	None	None	T1 heterogeneous, T2 heterogeneous	Not known	Excision
Abdul-Karim et al. [11] 1992	Comminuted femur fracture	35	Painful lump	Opacity w/o bone involvement	None	None	Heterogeneous	Schwannoma	Excision
Kouwenberg et Frölke [12]	Femur fracture/amputation	7	Painful stump, asymmetric gait	Outlining of compress, ossification	None	None	Heterogeneous with bone remodelling	Granuloma	Excision revision stump recut
Mouhsine et al. [13]	Venous stripping	3	Painless lump and adhesions	Opacity w/o bone involvement	Hyperechogenic, vascularized	None	T1 hyposignal, T2 hypersignal, G vascularization	Mesenchymal tumour	Excision
Lo et al. [14]	Ligament repair	5	Painful lump	Opacity w/o bone involvement	Hypoechogenic, acoustic shadowing	None	Central T1 hyposignal, central T2 hypersignal	Fibroma or sarcoma	Excision
Shiraev et al. [2]	Sarcoma excision	0.5	Fistula discharge	None	None	None	T2 hyposignal, T2 FATSAT hypersignal	Scarcoma recurrence	Excision
Sadeghifar et al. [15] 2013	Femur open IM nailing	35	Painful mass and redness	Outlining of compress and bone remodelling	None	None	None	Gossypiboma	Excision
Kalbermatten et al. [16]	Femur fracture fixation	25	Painful lump and weakness	Opacity, osteolysis	None	None	T1 hyposignal, T2 heterogeneous, G uptake	Malignant tumour	Biopsy then cancer excision
Mboti et al. [17]	Femur IM nailing	23	Pathological femur fracture	Comminuted fracture, opacity	None	None	Heterogeneous, peripheral G uptake	Sarcoma	Biopsy then cancer excision, fixation, graft
Patel et al. [18]	Ankle fracture fixation	2	Painless lump	Brightness w/o bone involvement	None	None	None	Not known	Excision and hardware removal
Suh et al. [19]	DHS femur	16	Painful lump and disability	Opacity, osteolysis with neck fracture	Solid element and blood	None	T1 isosignal, T2 hyposignal, T2 peripheral hypersignal	Tumour	Excision and arthroplasty
Uchida et al. [20]	Femur fracture open reduction then traction	46	Painful lump	Opacity, bone remodelling	None	Hypodensity w/o uptake	T1 hyposignal, T2 heterogenous	Not known	Excision

CT: computed tomography scan; MRI: magnetic resonance imaging (T1–T2 sequences and gadolinium injection if uptake); G: gadolinium; peri: peripheral; DHS: dynamic hip screw; IM: intramedullary; time: between initial procedure and clinical signs; excision: tumour excisions without safety margins; cancer excision: tumour excision with safety margins; none: not performed; UK: unknown–information not found in article; US: ultrasonography.

Table 2
Selected review of literature of gossypiboma cases in all locations other than the limbs (1988–2014) consisting of 16 articles.

Reference	Number of cases	Location	Imaging carried out	In favour of gossypiboma
Kul et al. [21]	1	Breast	US MRI gado/dyna	Acoustic shadowing, not vascularized, peri uptake
Slater et al. [5]	2	Brain	Diffusion MRI	Increased diffusion
Kohli et al. [22]	2	Abdomen, pelvis	XR US CT MRI	Acoustic shadowing, not vascularized, peri uptake
Sahin et al. [4]	3	Spine	MRI	Not suspected
Wan et al. [23]	1	In vitro	US CT	Acoustic shadowing
Garcia de llanos et al. [24]	1	Lung	XR CT PET	Not suspected
Vayre et al. [25]	1	Mediastinum	US CT MRI	Not vascularized, peri uptake
Liessi et al. [26]	9	Abdomen	XR US CT	Calcification, acoustic shadowing, not vascularized, peri uptake
Coche et al. [27]	12	Abdomen	US CT	Acoustic shadowing (11), not vascularized, peri uptake (5)
Kim et al. [28]	4	Abdomen, pelvis	MRI gado	Not vascularized, peri uptake
Ridene et al. [29]	8	Thorax	XR (2) US (5) CT (8) MRI + gado (1)	Acoustic shadowing (3), not vascularized, peri uptake (8)
Sun et al. [30]	1	Pelvis	US CT	Outlining of compress on CT
Lu et al. [31]	1	Abdomen	XR CT	Calcification
Kim et al. [32]	7	Spine	MRI gado	Not vascularized, peri uptake (6)
Le HBQ et al. [33]	1	Breast	US CT	Acoustic shadowing, not vascularized, peri uptake
Le Néel et al. [1]	25	Abdomen (18), bone (7)	XR US CT	Outlining of compress, acoustic shadowing, not vascularized, peri uptake

XR: X-rays; US: ultrasound; CT: computed tomography; MRI: magnetic resonance imaging (T1-T2 sequence); gado: gadolinium injection; PET: positron emission tomography; dyna: dynamic sequence; peri: peripheral.

Table 3
Imaging modality used and imaging findings of gossypiboma (review of literature) in the limbs and other locations.

	XR	CT scan	US	MRI	Bone involvement (XR)	Peri uptake (CT)	T1 hypo (MRI)	No vasc. (MRI)	Acoustic shadowing (US)
Limbs	15/16 (93%)	3/16 (18%)	4/6 (25%)	13/16 (81%)	9/15 (65%)	2/3 (66%)	6/13 (46%)	8/13 (62%)	1/4 (25%)
Other locations	6/16 (37%)	11/16 (68%)	10/16 (62%)	8/16 (50%)	–	7/11 (63%)	–	–	8/10 (80%)
Total	21/32 (66%)	14/32 (43%)	14/32 (43%)	21/32 (16%)	9/15 (65%)	9/14 (64%)	6/13 (46%)	8/13 (62%)	9/14 (64%)

XR: X-rays; US: ultrasound; CT: computed tomography; MRI: magnetic resonance imaging (T1-T2 sequence); peri: peripheral; T1 hypo: hypointensity on MRI T1-weighted sequences, No vasc: no vascularization on MRI.

research to determine how the gossypiboma's hyperechogenicity produces this characteristic acoustic shadowing. They showed that the echogenicity increased when the water-logged surgical sponges were compacted. The numerous interfaces resulting from the fabric's fibres reflect the echoes and produce acoustic shadowing. They noted that abscesses and haematomas do not have the same appearance as gossypiboma [23].

Risk factors for intraoperative retention of a surgical item are surgery in an emergency context, non-scheduled surgery and a high body mass index [36]. Long-term clinical follow-up after excision of the gossypiboma is required. De Wailly et al. [37] described a case of gossypiboma excision that was followed by secondary development of a sarcoma-type tumour process. Is a biopsy truly needed in the presence of strong evidence for gossypiboma? The prudent approach is to systematically perform an imaging work-up that consists of X-rays, ultrasonography and MRI at a minimum. In limb locations, ultrasonography should be used most often because of the strongly suggestive acoustic shadowing (first described by Barriga in gossypiboma in 1984 [38]) and the combination with X-rays, MRI and surgical history (scar on clinical examination) help to make the diagnosis of gossypiboma. If the diagnosis is still uncertain, the European Sarcoma Network Working Group (ESMO) recommend discussing the cases in a multidisciplinary meeting and performing a biopsy when there is a suspected sarcoma in a limb [39,40].

5. Conclusion

Gossypibomas are a rare postoperative complication. An appropriate imaging work-up consisting of X-rays, ultrasonography and MRI at a minimum, must be performed. Bone involvement in X-rays, acoustic shadowing on ultrasonography and hypointense signal on T1-weighted MRI image with lack of vascularisation, combined with history of surgery (scar on clinical examination) are suggestive of gossypiboma. If there is the possibility of a soft tissue tumour, the case must be discussed in a multidisciplinary meeting and a biopsy must be performed beforehand.

Disclosure of interest

The authors declare that they have no competing interest.

References

[1] Le Néel JC, De Cussac JB, Dupas B, et al. Textiloma. A propos of 25 cases and review of the literature. Chirurgie 1994;120:272–6.
[2] Shiraev T, Bonar SF, Stalley P, Anderson SE. MRI "row of dots sign" in gossypiboma: an enlarging mass 8 months after sarcoma resection. Skeletal Radiol 2013;42:1017–9.
[3] Lv YX, Yu CC, Tung CF, Wu CC. Intractable duodenal ulcer caused by transmural migration of gossypiboma into the duodenum – a case report and literature review. BMC Surg 2014;14:36.
[4] Sahin S, Atabey C, Simşek M, Naderi S. Spinal textiloma (gossypiboma): a report of three cases misdiagnosed as tumour. Balk Med J 2013;30:422–8.
[5] Slater LA, Chandra RV, Holt M, Danks A, Chong W. Long-term MRI findings of muslin-induced foreign body granulomas after aneurysm wrapping. A report of two cases and literature review. Interv Neuroradiol J Peritherapeutic Neuroradiol 2014;20:67–73.
[6] Iwase T, Ozawa T, Koyama A, Satake K, Tauchi R, Ohno Y. Gossypiboma (foreign body granuloma) mimicking a soft tissue tumor with hip hemiarthroplasty. J Orthop Sci 2007;12:497–501.
[7] Bevernage C, Geusens E, Nijs S. Case report: a gossypiboma in the shoulder. Emerg Radiol 2006;12:231–3.

[8] Sakayama K, Fujibuchi T, Sugawara Y, Kidani T, Miyawaki J, Yamamoto H. A 40-year-old gossypiboma (foreign body granuloma) mimicking a malignant femoral surface tumor. Skeletal Radiol 2005;34:221–4.
[9] Puri A, Anchan C, Jambhekar NA, Agarwal MG, Badwe RA. Recurrent gossypiboma in the thigh. Skeletal Radiol 2007;36:95–100.
[10] Kominami M, Fujikawa A, Tamura T, Naoi Y, Horikawa O. Retained surgical sponge in the thigh: report of the third known case in the limb. Radiat Med 2003;21:220–2.
[11] Abdul-Karim FW, Benevenia J, Pathria MN, Makley JT. Case report 736: retained surgical sponge (gossypiboma) with a foreign body reaction and remote and organizing hematoma. Skeletal Radiol 1992;21:466–9.
[12] Kouwenberg IC, Frölke J. Progressive ossification due to retained surgical sponge after upper leg amputation: a case report. Cases J 2009;2:8592.
[13] Mouhsine E, Garofalo R, Cikes A, Leyvraz PF. Leg textiloma. Med Princ Pract 2006;15:312–5.
[14] Lo CP, Hsu CC, Chang TH. Gossypiboma of the leg: MR imaging characteristics. A case report. Korean J Radiol 2003;4:191–3.
[15] Sadeghifar AR, Saeed AR. Infected textiloma, 35 years after the operation for femur fracture, an extremely rare occurrence. Arch Bone Joint Surg 2013;1:41–3.
[16] Kalbermatten DF, Kalbermatten NT, Hertel R. Cotton-induced pseudotumor of the femur. Skeletal Radiol 2001;30:415–7.
[17] Mboti B, Gebhart M, Larsimont D, Abdelkafi K. Textiloma of the thigh presenting as a sarcoma. Acta Orthop Belg 2001;67:513–8.
[18] Patel A, Kulkarni G, Kulkarni S. Textiloma in the leg. Indian J Orthop 2007;41:237.
[19] Suh DH, Yoon JR, Kang KB, Han SB, Kim HJ, Lee SJ. A gossypiboma-induced pathological fracture of the proximal femur. Clin Radiol 2009;64:1132–5.
[20] Uchida K, Nakajima H, Yayama T, et al. Unusual foreign body granuloma (gauzoma) found 46 years after open reduction and fixation surgery for femoral shaft fracture. Joint Bone Spine 2010;77:486.
[21] Kul S, Günes G. Gossypiboma of the breast: imaging findings. J Radiol Case Rep 2010;4:21–5.
[22] Kohli S, Singhal A, Tiwari B, Singhal S. Gossypiboma, varied presentations: a report of two cases. J Clin Imaging Sci 2013;3:11.
[23] Wan YL, Huang TJ, Huang DL, Lee TY, Tsai CC. Sonography and computed tomography of a gossypiboma and in vitro studies of sponges by ultrasound. Case report. Clin Imaging 1992;16:256–8.
[24] García de Llanos C, Cabrera Navarro P, Freixinet Gilart J, Rodríguez Suárez P, Hussein Serhald M, Romero Saavedra T. Intrathoracic gossypiboma interpreted as bronchogenic carcinoma. Another false positive with positron emission tomography. Arch Bronconeumol 2007;43:292–4.
[25] Vayre F, Richard P, Ollivier JP. Intrathoracic gossypiboma: magnetic resonance features. Int J Cardiol 1999;70:199–200.
[26] Liessi G, Semisa M, Sandini F, Roma R, Spaliviero B, Marin G. Retained surgical gauzes: acute and chronic CT and US findings. Eur J Radiol 1989;9:182–6.
[27] Coche G, Pardonnet MH, Chanois AM, et al. Ultrasonography and X-ray computed tomography in the diagnosis of intra-abdominal textiloma. A propos of 12 cases. J Radiol 1988;69:243–51.
[28] Kim CK, Park BK, Ha H. Gossypiboma in abdomen and pelvis: MRI findings in four patients. Am J Roentgenol 2007;189:814–7.
[29] Ridene I, Hantous-Zannad S, Zidi A, Smati B, Baccouche I, Kilani T, et al. Imaging of thoracic textiloma. Eur J Cardiothorac Surg 2011;39:e22–6.
[30] Sun HS, Chen SL, Kuo CC, Wang SC, Kao YL. Gossypiboma – retained surgical sponge. J Chin Med Assoc 2007;70:511–3.
[31] Lu YY, Cheung YC, Ko SF, Ng SH. Calcified reticulate rind sign: a characteristic feature of gossypiboma on computed tomography. World J Gastroenterol 2005;11:4927–9.
[32] Kim HS, Chung TS, Suh SH, Kim SY. MR imaging findings of paravertebral gossypiboma. AJNR Am J Neuroradiol 2007;28:709–13.
[33] Le HBQ, Lee S, Malfair D, Munk PL. Imaging features of chest wall gossypiboma. J Ultrasound Med 2009;28:1265–8.
[34] Ribalta T, McCutcheon IE, Neto AG, Gupta D, Kumar AJ, Biddle DA, et al. Textiloma (gossypiboma) mimicking recurrent intracranial tumor. Arch Pathol Lab Med 2004;128:749–58.
[35] Manzella A, Filho PB, Albuquerque E, Farias F, Kaercher J. Imaging of gossypibomas: pictorial review. AJR Am J Roentgenol 2009;193(Suppl. 6):S94–101.
[36] Gawande AA, Studdert DM, Orav EJ, Brennan TA, Zinner MJ. Risk factors for retained instruments and sponges after surgery. N Engl J Med 2003;348:229–35.
[37] de Wailly P, Desurmont T, Arnault V, Soro K, Huten N, Kraimps J-L. Textilome postopératoire et cancer. J Chir (Paris) 2009;146:327–8.
[38] Barriga P, García C. Ultrasonography in the detection of intra-abdominal retained surgical sponges. J Ultrasound Med 1984;3:173–6.
[39] Honoré C, Méeus P, Stoeckle E, Bonvalot S. Soft tissue sarcoma in France in 2015: epidemiology, classification and organization of clinical care. J Visc Surg 2015;152:223–30.
[40] The ESMO/European Sarcoma Network Working Group. Soft tissue and visceral sarcomas: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Ann Oncol 2014;25(Suppl. 3):102–12.