

A RETROPERITONEAL TUMOR AS A LATE COMPLICATION OF THE USE OF BONE WAX

O. VERBORGT¹, K. VERELLEN¹, F. VAN THIELEN², M. DEROOVER³, L. VERBIST⁴, T. BORMS¹

Ordinary bone wax was used to stop bleeding from the iliac crest after procurement of autogenous bone graft harvesting. This gave rise to a large, symptomatic retroperitoneal tumor, which had to be removed operatively 19 years later. Microscopically, a bone wax granuloma was diagnosed. As far as the authors know this is the first case reported with such late and severe clinical complications after the use of bone wax.

Key words : bone wax ; local hemostatic agents ; granuloma.

Mots-clés : cire à os ; agent hémostatique local ; granulome.

INTRODUCTION

Bone wax is routinely used in orthopedic surgery to reduce bleeding from cut bone surfaces. It improves hemostasis and reduces postoperative hemorrhage, pain and edema. Foreign body reaction is a known complication of the use of bone wax, but in most cases it remains limited to an early reaction without severe clinical symptoms (1-3, 10). The authors report a large retroperitoneal tumor as a late, symptomatic complication of the use of bone wax.

CASE REPORT

A 62-year-old woman was admitted to the general surgery department of our hospital after she was diagnosed with a large retroperitoneal tumor in the left flank. Nineteen years previously, she had

undergone posterior fusion of the lumbar spine with autogenous bone grafts from the left ilium. During the past few years she started to complain of pain in the left flank, irregular stool and nausea. Recently, her pain became worse. Physical examination showed a round, palpable mass in the left flank that was not fixed. Blood tests were normal. Radiological work-up with ultrasound and CT-scan (fig. 1) revealed a large (8 x 6 x 4 cm) retroperitoneal tumor adjacent to the bone defect at the left iliac crest, where the bone grafts were harvested. There was no connection with the ascending colon or other intraperitoneal structures. Because it seemed very unlikely that this could be a hematoma after harvesting iliac bone grafts almost 20 years previously, it was deemed necessary to explore and excise this tumor in order to exclude a malignant tumor, such as a sarcoma.

In conjunction with the general surgeon, the tumor was totally removed through a retroperitoneal approach. We saw a large, well-circumscribed cystic mass with central caseous material enveloped in fibrous tissue (fig. 2a). In this cystic mass we found some small, hard pieces of bone wax (fig. 2b). Microscopy revealed a granulomatous foreign body reaction with numerous giant cells, lymphocytes, plasma cells and mononuclear phagocytes.

¹Department of Orthopedics, ² Department of Vascular and General Surgery, ³ Department of Radiology, ⁴ Department of Gastro-Enterology, Jan Palfijn Hospital, Merksem, Belgium.

Correspondence and reprints : O. Verborgt Department of Orthopedics, Jan Palfijn Hospital, Lange Bremstraat 70, 2170 Merksem, Belgium.

There were no postoperative complications. The patient had symptomatic relief and was discharged 5 days postoperatively.

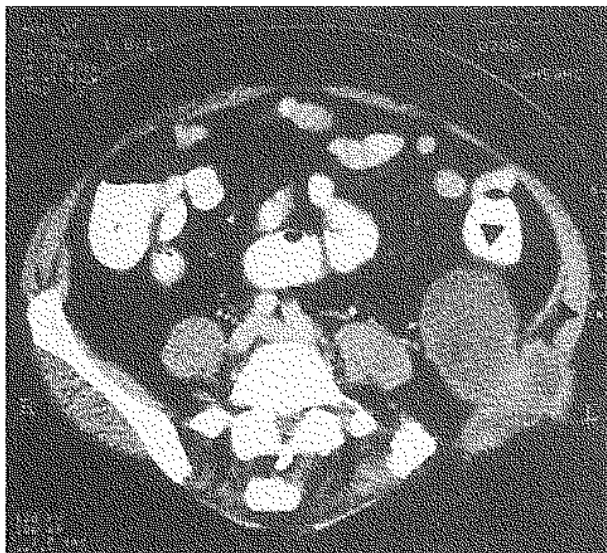


Fig. 1. — CT-scan revealed a large retroperitoneal tumor adjacent to the left iliac crest.

DISCUSSION

Protracted bleeding from cancellous bone surfaces often occurs when bone is cut and this can cause postoperative hematoma, pain and swelling, especially after harvesting of iliac bone grafts. Bone wax is a widely used local hemostatic agent to prevent postoperative bleeding from cut bone surfaces. It consists of 89 % refined beeswax and 11 % isopropyl palmitate, a softening agent. It physically blocks the passage of blood out of the cancellous bone surface. Bone wax is nonabsorbable and therefore it can, as any material implanted within body tissues, cause chronic inflammation and marked foreign body reaction (5,9). Animal studies showed a foreign body reaction and a chronic inflammation until the 12th week after implantation of bone wax in the iliac crest of sheep (11) and an inflammatory reaction for 6 weeks to 2 months in rats (5). Other complications reported in experimental studies are retarded bone healing (5), predisposition to infections due to impaired bacterial clearance (6) and wax embolization (8). However, the literature

contains very few reports of clinical, symptomatic complications after bone wax use. Zirna et al. (12) studied the effects of bone wax and gelfoam paste in 22 patients and reported no local tissue reaction or clinical symptoms. Sorrenti et al. (10) reported maximal tissue reaction inflammatory changes evident at 6-9 months following the application of bone wax in human tibias, but they did not report any severe, clinical symptoms. Only one group reported bone wax granuloma with clinical symptoms 4 to 52 months after the use of bone wax for resection of calcaneal exostosis (1). Few reports were found on bone wax granulomas in neuro- and thoracic surgery (4,7,8).

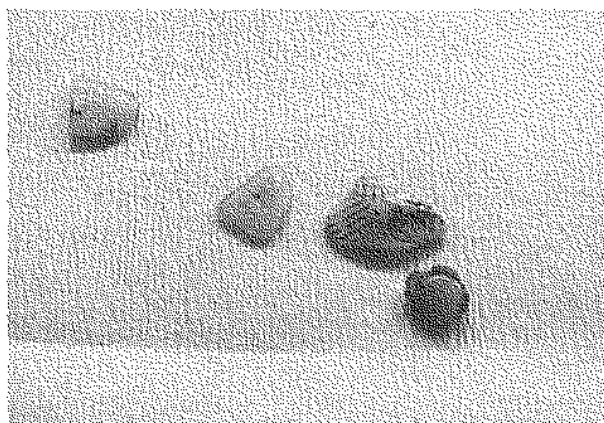
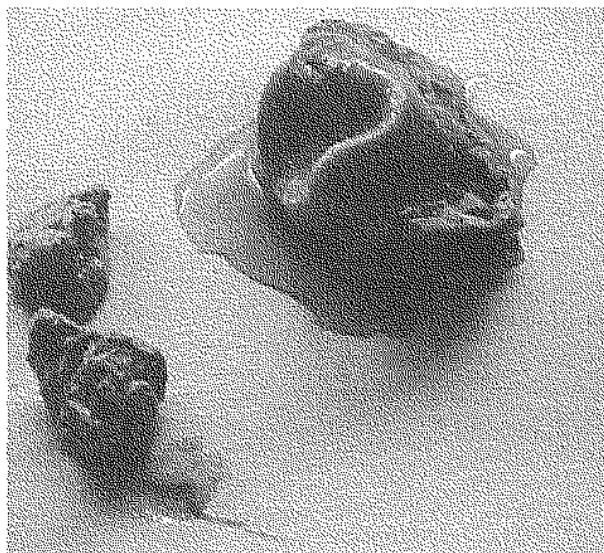


Fig. 2. — A large cystic mass with central caseous material was removed 19 years after bone wax was used to stop bleeding from the left iliac crest (left). The tumor was filled with several small, hard pieces of old bone wax (right).

In this case, the complication of the use of bone wax was severe and the period after the implantation was much longer, i.e. 19 years. The large retroperitoneal tumor caused discomfort to this patient for several years and could have led to compression of retro- or intraperitoneal organs resulting in even more severe complications. Furthermore, this patient underwent an extensive medical work-up before diagnosis was made and had to have a reoperation to relieve her symptoms.

Although bleeding from the ilium after removal of iliac bone grafts can be profuse, one should avoid using bone wax or other materials. Gentle wound suction for 24 to 48 hours combined with meticulous obliteration of dead space should be satisfactory for the management of these wounds. If one chooses to use a local hemostatic agent, this should ideally have an immediate hemostatic effect, it should be resorbable and should not inhibit bone healing. The foreign body reaction elicited should be transient.

REFERENCES

1. Anfinson O., Sudmann B., Rait M., Bang G., Sudmann E. Complications secondary to the use of standard bone wax in seven patients. *J. Foot Ankle Surg.*, 1993, 32, 505-508.
2. Aurelio J., Chenail B., Gerstein H. Foreign body reaction to bone wax. Report of a case. *Oral Surg. Oral Med. Pathol.*, 1984, 58, 98-100.
3. Baldauf R., Kanat I. The use of bone wax. *J. Foot Surg.*, 1986, 25, 456-458.
4. Chun P., Virmani R., Mason T., Johnson F. Bone wax granuloma causing saphenous vein graft thrombosis. *Am. Heart. J.*, 1988, 115, 1310-1313.
5. Howard T., Kelley R. The effect of bone wax on the healing of experimental rat tibial lesions. *Clin. Orthop.*, 1969, 63, 226-232.
6. Johnson P., Fromm D. Effects of bone wax on bacterial clearance. *Surgery*, 1981, 89, 206-209.
7. Lainez J., Fontana F., del Rosario Martin M., Sancho J., Barcia C. Intracranial granuloma as a late complication of subdural hematoma. *Arch. Neurobiol.*, 1989, 52, 105-107.
8. Robicsek F., Masters T., Littman L., Born G. The embolization of bone wax from sternotomy incisions. *Ann. Thorac. Surg.*, 1981, 31, 357-359.

9. Rockwood C., Perkins J., Roberts L., Dixon D. Reaction of bone wax on bone and muscle. *J. Bone Joint Surg.*, 1968, 50-A, 837-838.
10. Sorrenti S., Cumming W., Miller D. Reaction of the human tibia to bone wax. *Clin. Orthop.*, 1984, 182, 293-296.
11. Wolter D., Mohr W., Kinzl L. Reaction of the bone and soft tissues to implanted bone wax in sheep. *Chirurg*, 1975, 46, 459-462.
12. Zirna H., Keating S., DeVincentis A. Topical hemostatic agents to reduce bleeding from cancellous bone surfaces: A comparison of gelfoam paste and bone wax. *J. Foot Surg.*, 1987, 26, 496-500.

SAMENVATTING

O. VERBORGT, K. VERELLEN, F. VAN THIELEN, M. DEROOVER, L. VERBIST, T. BORMS. Een retroperitoneale tumor als late complicatie van het gebruik van bone wax.

Bone wax wordt routinematig gebruikt bij orthopedische ingrepen om bloeding vanuit bewerkte botoppervlakten te verminderen. Hoewel vreemd lichaam reacties zeldzaam zijn en eerder beperkt blijven tot vroegtijdige reacties met weinig klinische symptomen, dient de chirurg uiterst voorzichtig om te springen met hemostatische agentia. Wij beschrijven een casus waarbij een grote retroperitoneale tumor is ontstaan als een late, ernstige complicatie van het gebruik van bone wax.

RÉSUMÉ

O. VERBORGT, K. VERELLEN, F. VAN THIELEN, M. DEROOVER, L. VERBIST, T. BORMS. Tumeur rétro-péritonéale, complication tardive due à l'utilisation de cire à os.

Les auteurs rapportent le cas d'une patiente qui a présenté une tumeur rétro-péritonéale volumineuse et symptomatique, 19 ans après une opération sur le rachis qui avait comporté le prélèvement de greffons osseux à la crête iliaque. La tumeur, enlevée chirurgicalement, s'est avérée être un granulome réactionnel à la cire osseuse utilisée lors de la prise de greffe 19 ans plus tôt. Ce cas semble être le premier qui rapporte des complications aussi importantes et aussi tardives après utilisation de cire à os.