

## Ventriculo-Peritoneal Shunt (VPS) and Breast Cancer

Reuth Roisman <sup>(1)</sup>, Isaac Roisman <sup>(1)</sup>, Isaac Lifshitz <sup>(2)</sup>, Ofer Klemm <sup>(3)</sup>

(1) Horev Medical Center, Haifa;

(2) Kupat Holim Me'uhedet, Jerusalem;

(3) Kupat Holim Me'uhedet, Haifa, ISRAEL  
Carmel College, Daliat el Carmel

Dedicated to **Mrs Sell** and **Prof. Stewart Sell**

Correspondence to:  
Isaac Roisman, M.D., Dip.Surg., M.Surg., D.Sc.  
P.O.Box 45470, Haifa 31454, Israel  
Tel. (972-4)8388393, Fax: (972-4)8379503  
e-mail: [rtova@tx.technion.ac.il](mailto:rtova@tx.technion.ac.il)

## Ventriculo-Peritoneal Shunt (VPS) and Breast Cancer

**Reuth Roisman**<sup>(1)</sup>, **Isaac Lifshitz**<sup>(2)</sup>, **Ofer Klemm**<sup>(3)</sup>, **Yaron Har-Shay**<sup>(4)</sup>,  
**Guy Raphaeli**<sup>(5)</sup>, **Hila Kreizman**<sup>(1)</sup>, **Isaac Roisman**<sup>(1)</sup>, **Arie L. Durst**<sup>(6)</sup>.

**Carmel College, Daliat el Carmel**

<sup>(1)</sup> Horev Medical Center, Haifa,

<sup>(2)</sup> Kupat Holim Meuhedet, Jerusalem,

<sup>(3)</sup> Kupat Holim Meuhedet, Haifa,

<sup>(4)</sup> Carmel Medical Center, Haifa,

<sup>(5)</sup> Hadassah University Hospital, Ein Karem, Jerusalem,

<sup>(6)</sup> Bikur Holim Medical Center, Jerusalem

I s r a e l

Dedicated to **Mrs. Sell** and **Prof. Stewart Sell**

Research Physician, Wadsworth Center, Diagnostic Oncology

Senior Scientist, Ordway Research Institute, Inc.

Professor, School of Public Health, Biomedical Sciences

Correspondence to:

Isaac Roisman, M.D., Dip. Surg., M. Surg., D.Sc.

P. O. Box 45470, Haifa 31453, Israel

Tel. (972-4)8388393 Fax: (972-4)8379503

e-mail: rtova@tx.technion.ac.il

### **Ventriculo-Peritoneal Shunt (VPS) and Breast Cancer**

At the best of our knowledge this is the second presenting patient with breast cancer which encircled Ventriculo-Peritoneal shunt (VPS). The first one was documented by Keshtgar, Ahmed and Baum <sup>(1)</sup>.

#### **Clinical History**

A 53 years old woman, married with two children presented with a palpable lump 2.5X3 cm in the outer quadrant of the left breast. There were no palpable axillary lymph nodes. Triple assessment confirmed the diagnosis of left breast carcinoma and she was scheduled to undergo lumpectomy.

Review of her medical records revealed that at the age of 34 she was treated with hormonal supplement medication. At the age of 40 years old she had insertion of Ventriculo-Peritoneal shunt (VPS) for treatment of late hydrocephalus after subarachnoid hemorrhage.

#### **Radiographic findings**

##### **Mammogram of the left breast**

Mediolateral oblique and craniocaudal views depicting satellite homogenous density in the upper outer quadrant 2.5x3 cm with a straight long material which is the Ventriculo-Peritoneal shunt (VPS).



**Fig. 1 – Mammogram Lt. Breast**

**Ultrasound scan** of the upper outer quadrant of the left breast showing a curvilinear hyperechoic area corresponding to the tumor with intense, sharply delineated posterior acoustic shadowing and the shunt.

In the operating theatre, the patient received broad spectrum prophylactic antibiotics. The course of the Ventriculo-Peritoneal Shunt (VPS) was marked on the patient's skin. At operation, great care was exercised to avoid sharp dissection around the catheter and to avoid any damage to the shunt. A left lumpectomy and axillary lymph nodes dissection was performed.

**Histopathology:** invasive duct carcinoma grade III and intraductal carcinoma. No invasion to axillary lymph nodes.

The patient made an uneventful post-operative recovery and the shunt was functioning well after operation.

## Discussion

This patient illustrates the importance of appropriate precaution in breast surgery. The radiological literature rarely reported on foreign bodies in a routine mammogram.

It can usually be accounted in the setting of a history of fragments from a gunshot wound, or from gold therapy, residual metal shaving and fragments associated with large-core biopsy, metallic particles on mammography after wire localization, Tattoos simulating calcifications on mammography, suture calcification material in the breast after radiation therapy, soap artifact that can mimic intramammary calcifications,<sup>(2)</sup> or surgical sponge: gossypiboma<sup>(3)</sup> metallic punctuate densities in the breast after Chinese herbal treatment<sup>(4)</sup>. But a ventriculo-peritoneal shunt (VPS) is once rare documented.

In the VPS procedure it is important that the neurosurgeons keep in mind the possibility of breast surgery in female patients in future and the position of VPS.

Ventriculo-Peritoneal Shunt is inserted for many reasons including primary hydrocephalus, secondary hydrocephalus subsequent to treatment of acoustic

neuroma, late hydrocephalus after subarachnoid hemorrhage<sup>(5)</sup>, Dandy-Walker malformation<sup>(6)</sup> malignancy related hydrocephalus<sup>(7)</sup>, metastasis and other etiologies<sup>(8-16)</sup>.

Surgical management by ventriculo-peritoneal shunt is an important component to multimodality therapy with intrathecal chemotherapy, radiation or both.

It is reported about two patients with leptomeningeal metastatic disease: one from breast cancer and the other from a spinal cord glioma, who developed elevated intracranial pressure manifested by headache and spinal radicular pain. Symptoms of pain promptly and completely resolved with opening of the on-off valve of each patient's ventriculo-peritoneal shunt<sup>(17)</sup>.

Lokich et al<sup>(7)</sup> described three patients with hydrocephalus secondary to central nervous system (CNS) metastases from lung or breast cancer representing less than 5% patients with CNS metastases seen at The Cancer Centre of Boston over a 10-year period. Surgical management by ventricular peritoneal shunt is an important component to multimodality therapy.

Carcinomatous meningitis can occur with virtually any tumor type but for solid tumors is mostly commonly associated with breast cancer and lung cancer<sup>(18-23)</sup>.

Many complications may occur in the insertion of VPS. It includes: liver abscess<sup>(24)</sup> changes in visual acuity associated with shunt failure<sup>(25)</sup>, abdominal complications in children with peritoneal shunt for hydrocephalus<sup>(26)</sup> extrusion of the catheter tip of VPS through the old scar of percutaneous endoscopic gastrostomy (PEG<sup>(27)</sup> dysfunction of ventriculo-peritoneal shunt after posterior spinal fusion in children with cerebral palsy<sup>(28)</sup>, nonclosure of the peritoneum at shunt insertion<sup>(29)</sup>, ventriculo-peritoneal shunt infections and malfunctions in children with hydrocephalus<sup>(30)</sup> unusual migration of the distal catheter of a ventriculo-peritoneal shunt into the heart<sup>(31)</sup>, shunt malfunction presenting with cerebral edema<sup>(32)</sup> and other reasons.

A meeting was held within the International Agency for Research on Cancer (IARC) to evaluate the carcinogenic risks to humans of surgical implants and other foreign bodies in the breast.

The VPS shunt is not documented to induce breast cancer nor does silicone implant.

The 30 case reports of breast cancer (i.e. carcinomas, not sarcomas) following breast silicone implants for cosmetic augmentation appear unlikely to correspond to an excess of breast cancer. Five cohort studies involving a total of more than 18,000 women treated with surgical prostheses made of silicone (or polyurethane-coated silicone) for cosmetic augmentation conducted in Canada, Denmark, Sweden and the United States consistently found no evidence of increased risk of breast carcinoma. The combined results of the four largest cohort studies show a 25% reduction in risk. All cohort studies were based on subjects exposed to implanted silicone at a relatively early age, usually between 30 and 40 years, so that the number of breast cancer cases reported by each study was relatively small. Three of the studies considered the issue of latency, with observation periods up to 10 years or more, but even in the group of women with follow-up of 10 years or more, there was no suggestion of increased

risk. The risk of cancer following surgical implantation of silicone prostheses for breast reconstruction after breast cancer was considered in a study from France. The results of this study suggest no excess risk of second primary breast or other cancer, distant metastases, local recurrence or death from breast cancer. The reduced risks of developing breast cancer found in the cohort and case-control studies are unlikely to be due to chance, and no bias that would explain these findings has been identified<sup>(33)</sup>.

### Conclusion

We introduced the management of a rare patient with breast carcinoma which encircled a Ventriculo-Peritoneal Shunt.

### Bibliography

1. Keshtgar MR., Ahmed AR., Baum M. Ventriculo-peritoneal shunt and breast carcinoma. *Ann R Coll Surg Engl*, 2001; 83: 281-282.
2. Haigh PL, Brenner RJ, Giuliano AE. Origin of metallic particles resembling microcalcifications on mammograms after use of abrasive cautery-tip cleaning pads during breast surgery: experimental. *Radiology*, 2000; 216: 539-544.
3. El Khoury M., Mignon F., Tardivon A. et al. Retained surgical sponge or gossypiboma of the breast. *Eur J Radiol*, 2002; 42: 58-61.
4. Moon WK., Park JM., Im JG. et al. Metallic punctate densities in the breast after Chinese herbal treatment: mammographic findings. *Radiology*, 2000; 214: 890-894.
5. Hirashima Y., Hamada H., Hayashi N. et al. Independent predictors of late hydrocephalus in patients with aneurysmal subarachnoid hemorrhage - analysis by multivariate logistic regression model. *Cerebrovasc Dis*, 2003; 16: 205-210.
6. Kawaguchi T., Jokura H., Kusaka Y. et al. Intraoperative direct neuroendoscopic observation of the aqueduct in Dandy-Walker malformation. *Acta Neurochir*, 2003; 145: 63-67.
7. Lokich J., Levine H., Nasser I. Malignancy-related hydrocephalus: clinical features and results of ventricular peritoneal shunt procedure in three patients. *Am J Clin Oncol*, 1998; 21: 366-368.
8. Demopoulos A. leptomeningeal metastases. *Curr Neurol Neurosci Rep* 2004; 4:196-204.
9. Glantz MJ, Jaeckle KA, et al. a randomized controlled trial comparing intrathecal sustained-release cytarabine (DepoCyt) to intrathecal methotrexate in patients with neoplastic meningitis from solid tumors. *Clin Cancer Res* 1999; 5:3394-3402.
10. Herrlinger U, Förschler H, et al. leptomeningeal metastasis: survival and prognostic factors in 155 patients. *J Neurol Sci* 2004; 223:167-178.
11. Halperin EC, Samulski T, et al. fabrication and testing of a device capable of reducing the incidence of ventricular shunt promoted metastasis. *J Neurooncol* 1996; 27:39-46.
12. Isaacman DJ, Poirier MP, et al. ventriculoperitoneal shunt management. *Pediatr Emerg Care* 2003; 19:119-125.
13. Yamashita N, Kamiya K, Yamada K. Experience with a programmable valve shunt system. *J Neurosurg* 1999; 91:26-31.
14. Sandberg DI, Bilsky MH, Souweidane MM, et al. Ommaya reservoirs for the treatment of leptomeningeal metastases. *Neurosurgery* 2000; 47:49-54.
15. Omuro AM, Lallana EC, Bilsky MH, et al. Ventriculoperitoneal shunt in patients with leptomeningeal metastases. *Neurology*. 64(9):1625-7.
16. Mizuno M, Asakura K, Nakajima S, et al. Renal cell carcinoma metastasizing to choroid plexus of lateral ventricle; a case report. *No Shinkei Geka* 1992; 20:469-74.
17. Groves MD, McCutcheon IE., Ginsberg LE. et al. Radicular pain can be a symptom of elevated intracranial pressure. *Neurology*, 1999; 52: 1093-1095.
18. Liaw CC, Ng ET., Huan JS., et al. Meningeal carcinomatosis from solid tumors: clinical analysis of 42 cases. *J Formos Med Assoc*, 1992; 91: 299-303.
19. Jayson GC, Howell A., Carcinomatous meningitis in solid tumours. *Ann Oncol*, 1996; 7: 773-786.
20. Nakagawa H., Murasawa A., Kubo S., et al. Diagnosis and treatment of patients with meningeal carcinomatosis. *J neurooncol*, 1992; 13:81-89.
21. Peres de Colosia V., Tunon A., Pelaez I., et al. Meningeal carcinomatosis. Review of 30 cases. *RevClinEsp*, 1994; 194: 530-534.
22. Moots P., Harrison MB., Vandenberg SR. Prolonged survival in carcinomatous meningitis associated with breast cancer. *South Med J*, 1995; 88: 357-362.
23. Ohnishi T., Ueoka H., Kiura K., et al. Meningeal carcinomatosis in patients with small cell lung cancer. *Nippon Kyobu Shikkan Gakkai Zasshi*, 1993;31:324-329.

24. Shen MC, Lee SS., Chen YS. et al. Liver abscess caused by an infected ventriculo-peritoneal shunt. *J Formos Med Assoc*, 2003; 102: 113-116.
25. Kraus R., Hanigan WC, Kattah J. et al. Changes in visual acuity associated with shunt failure. *Childs Nerv Syst*, 2003; 19: 226-231.
26. Esposito C, Colella G., Settini A. et al. One-trocar laparoscopy: a valid procedure to treat abdominal complications in children with peritoneal shunt for hydrocephalus. *Surg Endosc*, 2003; 17: 828-830.
27. Chan Y., Datta NN, Chan KY. et al. Extrusion of the peritoneal catheter of a VP shunt system through a gastrostomy wound. *Surg Neurol*, 2003; 60: 68-69.
28. Abu-Sheineh K., Lipton GE., Gabos PG. et al. Dysfunction of a ventriculo-peritoneal shunt after posterior spinal fusion in children with cerebral palsy: a report of two cases. *J Bone Joint Surg Am*, 2003; 85-A: 1119-1124.
29. Musharbash A. Nonclosure of the peritoneum at shunt insertion. *Pediatr Neurosurg*, 2003; 39: 25-26.
30. Lan CC, Wong TT, Chen SJ. et al. Early diagnosis of ventriculo-peritoneal shunt infections and malfunctions in children with hydrocephalus. *J Microbiol Immunol Infect*, 2003; 36: 47-50.
31. Rodriguez-Sanchez JA., Cabezudo-Artero JM., Porras Estrada LF. Unusual migration of the distal catheter of a ventriculo-peritoneal shunt into the heart: case report. *Neurosurgery*, 2003; 52 :1510
32. Owen R., Pittman T. Shunt malfunction presenting with cerebral edema. *Pediatr Neurosurg*, 2003; 38: 110-112.
33. McGregor DB., Baan RA., Partensky C. et al. Evaluation of the carcinogenic risks to humans associated with surgical implants and other foreign bodies - a report of an IARC Monographs Programme Meeting. *EurJCan*