

Clinical Application of Breast Fiberoptic Ductoscopy in 354 Cases with Abnormal Nipple Discharge

Hengwei Zhang¹

Guifen Yang²

Hua Yang¹

Fawen Liu¹

Shude Cui¹

¹ Department of Mastology, Henan Tumor Hospital, Zhengzhou 450003, China.

² Department of Mastology, Maternal and Child Health Hospital, Jiyuan 454650, China.

OBJECTIVE To use the breast duct endoscope for studying the pathological characteristics of breast-duct disease with nipple discharge, and offer methods that can improve diagnostic accuracy.

METHODS A total of 354 patients with nipple discharge were examined using the fiberoptic duct endoscope (FVS-3000M). Ducts and their branches were investigated to define and locate the extent of intraductal lesions. Core biopsies were taken of suspicious lesions and the findings were analyzed retrospectively.

RESULTS In cases of bloody and serosanguineous nipple discharge, 72.3% were papilloma and papillomatosis, 5.2% duct cancer and 22.5% mammary duct ectasia and galactophoritis. In patients with watery nipple discharge, 56.0% were papilloma and papillomatosis, 8.0% were breast cancer and 5 patients without abnormal findings were regarded as normal.

CONCLUSION Fiberoptic duct endoscopy can accurately locate the site and pathology of nipple discharge allowing the improvement in diagnosis of early breast cancer.

KEYWORDS: nipple discharge, fiberoptic duct endoscopy, breast cancer.

Nipple discharge in non-lactating women of childbearing age is one of the common symptoms of breast diseases, making up 6.0% of the outpatients at our Breast Department. Since the 1990s, the clinical application of breast duct endoscopy has provided a brand-new means for examining and diagnosing nipple discharge. From October 2000 to November 2002, we examined 354 cases with nipple discharge by duct endoscopy and have summarized our findings for this report.

MATERIALS AND METHODS

General data

This study is of 354 cases presenting with nipple discharge at our outpatients department from October 2000 to November 2002, and is comprised of 1 male and 353 females. There were 329 cases (92.9%) with single orifice discharge, and 25 (7.1%) with cribriform discharge, 16 cases had palpable clumps in the nipple and areola at the clinical examination. As for the cases with serous discharge, which was

Received May 8, 2004; accepted July 12, 2004.

Chinese Journal of Clinical Oncology

Email: COCR@eyou.com Tel(Fax): 86-22-2352-2919

yellow or bloody serosanguineous discharge, 351 cases were successfully examined with a success rate of 99.2% (3 cases failed). In 1 case, passage of the endoscope through the duct scar stenosis was not possible due to nipple trauma while feeding, the other 2 cases failed because of a "mesh-like" outlet of the major mammary duct.

The mean age of all patients was 48.6 years (range 17-82 years), and the average duration of nipple discharge was 8.7 months (range 2 days-10 years). Biopsy under undirect vision was applied when suspicious canceration was found by endoscopic examination. Of the 245 cases found with space-occupied lesions and/or ill-structured vessel walls who were candidates for a surgical excision biopsy, 186 patients accepted the procedure. Patients without suspicious cancerational findings were all treated with a discharge duct douche, and the perfusate retrieved and centrifuged for a smear cytologic examination.

Methods of examination

The light guide fiber of the fiberoptic duct endoscope (FVS-3000, Japan) is of two types (diameter 0.72 mm and 0.45 mm), the former was more convenient to use. Patients were examined in a supine position, No.0-6 bougies were used under local anaesthesia to enlarge the discharging duct after routine disinfecting and draping. Then the duct endoscope was inserted slowly into the duct orifice. Normal saline was then perfused into the duct to insure the patency of the duct during the procedure. The structure of the discharging duct, its branches and their lumens could be observed by the endoscope. Relative location of the nipple and the endoscope could be regulated to gain the best images and photos. Videos were taken simultaneously to record morphological characteristics of the lesion. Location of the focus was defined after it was found and the lesion localized relative to the body surface. A needle biopsy was taken and sent for pathological examination when necessary.

Biopsy under duct endoscopy

After the lesion was located, the biopsy trocar and the

duct endoscope were inserted together to the lesion site and then the endoscope was removed. The trocar was connected to a 20 ml syringe to develop negative pressure while it was moved inward and rotated a little at the same time. A sample of the lesion was incised for pathological examination.

RESULTS

Using duct endoscopy, 171 cases (48.3%) in this group were diagnosed as papilloma, 58 (16.4%) as papillomatosis; 21(5.9%) as mammary duct ectasia; 76 (21.5%) as galactophoritis; 16 (4.5%) as duct cancer; 4 (1.1%) as lactation disease. In addition, there were 5 cases with no demonstrable lesions in the intrawall. Three cases who failed to be examined were under follow-up survey.

Discharge characteristics

Bloody discharge was found in 145 cases (40.9%) in this group in which 87 (24.6) had serosanguineous discharge (1 case failed to be examined), 80 (22.6%) had serous discharge (1 case failed to be examined), 16 (4.5%) had milky discharge (3 cases had lactation disease), 25 (7.1%) had watery discharge (1 case failed to be examined), and 1 (0.3%) had purulent discharge. The relationship between discharge characteristics and intraductal lesions is shown in Table 1.

Location of lesions

Space-occupied lesions of 68 cases occurred in the first duct branch, 89 cases in the second duct branch, 70 in the third and 18 in the fourth. The situation for space-occupied lesions and their location in the duct branch is shown in Table 2.

Results of pathological examination

Seven cases examined by microscopic biopsy had positive results. The rate of correspondence was 43.8%. Nine cases in which a rapid frozen sample was taken during operation for pathological examination were verified to be cancer. In those cases, 2 underwent a modified radical operation with skin preservation and instant mastoplasty. One case received a simple

Table 1. The relationship between discharge characteristics and intraductal lesions

| Discharge characteristic | Normal | Papilloma | Papillomatosis | Mammary duct ectasis | Galactophoritis | Duct cancer | Total |
|--------------------------|--------|-----------|----------------|----------------------|-----------------|-------------|-------|
| Bloody | - | 84 | 25 | 5 | 24 | 7 | 145 |
| Serosanguineous | - | 42 | 16 | 8 | 15 | 5 | 86 |
| Serous | 1 | 32 | 11 | 6 | 27 | 2 | 79 |
| Milky | 3 | 4 | 1 | 2 | 3 | - | 13 |
| Watery | 1 | 9 | 5 | - | 6 | 2 | 23 |
| Purulent | - | - | - | - | 1 | - | 1 |
| Total | 5 | 171 | 58 | 21 | 76 | 16 | 347 |

4 cases with lactation disease and 3 cases failed to be examined were not included.

mastoplasty by postoperation radiotherapy, and 13 were treated with a modified radical operation. Upon postoperational pathological examination, 2 cases were found to have carcinoma which arose from intraductal papillary lesions, 7 were shown to have duct cancer, 4 were diagnosed as duct cancer with infiltration, 2 with infiltrating duct cancer, 1 with medullary carcinoma, 107 with intraductal papilloma, 42 with papillomatosis, 14 with mammary duct ectasia, 4 with galactophoritis and 3 with cystic hyperplastic carcinoma. As for non-space-occupied lesions diagnosed by endoscopy, tumor cells were not found in the duct perfusate.

Table 2. Results for space-occupational lesion and its duct branch location

| Duct classification | Papilloma | Papillomatosis | Duct cancer | Total |
|---------------------|-----------|----------------|-------------|-------|
| I | 58 | 7 | 3 | 68 |
| II | 63 | 18 | 8 | 89 |
| III | 42 | 23 | 5 | 70 |
| IV | 8 | 10 | - | 18 |
| Total | 171 | 58 | 16 | 245 |

DISCUSSION

Nipple discharge can be classified into 2 types, physiologic nipple discharge and pathologic nipple discharge (or called lactational and non-lactational). Generally speaking, clinical nipple discharge refers to pathologic abnormal nipple secretion, which accounts for 2.3% -17.5% of breast disease.^[1] About 10% of

women can be found to have nipple discharge in routine physical examinations.^[2] The primary diseases are as diverse as discharge characteristics, such as breast intraductal papilloma, papillomatosis, breast cancer, mammary duct ectasia and cystic hyperplasia of the breast etc. Extensive research has established that 10-15% of unphysiologic nipple discharge is due to breast cancer,^[3] while breast duct epithelial atypical proliferation, papillomatosis and cystic hyperplasia are believed to be common precancerous lesions.^[4-7] Methods used to diagnose this kind of disease mainly involve molybdenum palladium roentgenography of the breast, nipple discharge smears and mammary ductography etc. These above methods all produce indirect signs and are greatly influenced by subjective factors resulting in their common defects and a low positive diagnostic rate. Patients are subjected to physiological and economic burdens because final diagnosis has to be established by excision biopsy. The range of surgical excision has always been in excess due to lack of accurate localization of the lesion. In addition, the incidence of multiple primary breast cancer in China is significantly lower than that in European and American countries.^[8] Therefore, missed diagnosis in pathological examinations tended to be a result of multiple lesions and the rate of missed diagnosis could reach as high as 9% according to the article reported by Shen et al.^[9] The development of the breast duct endoscopy has effectively made up for the above defects, as by its use one can directly observe to the fourth branches and project the vessel wall microchanges clearly onto a monitor, thus

providing valuable help in the decision process.^[10]

Discharge characteristics are always regarded as prominent signals to judge intraductal lesions. Although several ductal inflammatory lesions with dispersed hemorrhagic spots can present (old) bloody or serosanguineous discharge due to local or extensive congestion of the duct wall, bloody discharges are more common in cancer. The incidence of cancer in young women is below 5%, but this frequency can reach up to more than 60% in women above 50.^[11] In our patients, papilloma plus papillomatosis were 72.3%, duct cancer was 5.2%, mammary duct ectasia and galactophoritis were 22.5%. Based on our experiments, patients with bloody and serosanguineous nipple discharge should be accorded more attention. Watery nipple discharge often has a tendency to be neglected, which in this group was 6.7% (the smaller amount may be related to fewer patients chosen for examination). However, with this kind of discharge, papilloma and papillomatosis were 56.0%, breast cancer was 8.0%, indicating that watery discharge should also be considered to be serious. We believe that all women of childbearing age with non-lactating nipple discharge should be regarded as objects for a breast-duct endoscopic examination.

Endoscopy can directly observe the breast duct epithelium and duct lumens. Lesions that are found can be localized and biopsy tissue directly taken. It is not difficult to perform the examination in the first and second branches, the rate of success being high. Successful biopsy results in our patients were with lesions mostly in the first or second branches. Because biopsy cannot be proceeded under direct vision and it is difficult to move the trocar beyond the second branches, our attempts for biopsy failed in the third and fourth branches. The lesions in 5 cases of duct cancer in which biopsies failed were located in the third and fourth branches. In our view, there are 2 reasons that can explain the high rate of failed biopsy. First, the biopsy sample was too small because of insufficient experience, and second, the biopsy needle could not be accurately inserted to a lesion located in the duct branches in unvisualized biopsy, so that the

variation of the sampling position caused false negative results. Lesions can be located by breast duct endoscopy and surgical excision performed for pathological examination in order to confirm a diagnosis for cases that are greatly suspected to be cancer. As for the intraductal non-space-occupied lesions, if tumor cells are found in the perfusate, a surgical excision biopsy can be performed.

REFERENCES

- 1 Li SL, Chief editor. Breast cancerology. Scientific and Technical Documents Publishing House, Beijing. 2000; 157-161.
- 2 Shen KW, Lu JS, Yuan JD, et al. Fiberoptic ductoscopy for patients with intraductal papillary lesions. *Chin J Surg.* 2000; 38:275-277.
- 3 Van Zee KJ, Ortega PG, Minnard E, et al. Preoperative galactography increase the diagnostic yield of major duct excision for nipple discharge. *Cancer.*1998;82: 1874 - 1880.
- 4 Ohucni N, Abe R, Kasai M, et al. Possible cancerous change of intraductal papillomas of the breast. *Cancer.* 1984; 54:605-611.
- 5 Zhang ZD, Li SL, Fu XL, et al. Whole organ giant section histopathologic studies on breast cancer benign lesions in cancerous breast and near the tumor areas. *Chin J Oncol.*1993; 15:20-22.
- 6 Liu W, Li SL, Fu XL. A study of proliferative lesions in breast and its relationship with cancer (A immunohistochemical study). *Chin J Clin Oncol.* 1996; 23:695-699.
- 7 Tian YT, Li SL, Fu XL. Pathological study of en bloc breast sections in papillomatosis and its malignant transformation. *Chin J Clin Oncol.* 1997; 19:290-292.
- 8 Tian YT, Yao YW, Liu ZM. Relative factors for local recurrence of conventional surgery for breast cancer. *Chin J Clin Oncol Rehabil.*1997; 4:78-79.
- 9 Shen KW, Wu J, Lu JS, et al. Fiberoptic ductoscopy for patients with nipple discharge. *Cancer.* 2000; 89:1512 - 1519.
- 10 Shen ZZ, Shao ZM, chief editor. Development of Modern Breast Cancer. Scientific and Technical Documents Publishing House, ShangHai. 2002; 47-55.
- 11 Wang ZF, chief editor. Current practical diagnosis and therapy for mammary disease. Scientific and Technical Documents Publishing House, Zhenzhou, Henan. 2000; 226-239.