Study of Benign and Malignant Intraductal Lesions of the Breast by Fiberoptic Ductoscopy

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OBJECTIVE To observe and subtype the appearance of intraductal papilloma (lesions) and of infiltrating ductal carcinoma or early infiltrating ductal carcinoma using a fiberoptic ductoscope (FDS) examination, and to discuss the differentiation and diagnosis of benign and malignant tumors by FDS.

METHODS The characteristics of FDS images and diagnostic data for 229 patients with intraductal papilloma (lesions) and 50 patients with ductal carcinoma, who were confirmed by surgical pathology from October 1998 to December 2003, were analyzed retrospectively.

RESULTS The appearance of the lesions observed by FDS were grouped into 4 types: a monothelia (type I), polythelia (type II), superficies (type III) and a mixture (type IV). Intraductal papillomas (lesions) were more commonly seen in type I and II, and intraductal carcinomas or early infiltrating ductal carcinomas were more commonly seen in type III and IV; there was a statistically significant difference in the distribution of the ductoscopic types, except in type II, between the two types of lesions, $P<0.001$. The focal detection rate by FDS for intraductal papilloma and papillomatosis was 99.6% (228/229) and for breast cancer was 96.0% (48/50). The diagnostic accuracy was 97.8% (224/229) and 82.0% (41/50), respectively.

CONCLUSION FDS can be a guide for the treament of benign and malignant intraductal tumors, with early discovery and accurate diagnosis.

KEYWORDS: papilloma/diagnosis, breast neoplasm/diagnosis, endoscopy/methods.

Clinical data from patients undergoing fiberoptic ductoscope (FDS) examinations in the Guangdong Maternal and Children's Hospital (GMCH) were investigated retrospectively, and the value of FDS for diagnosis and differentiation of benign and malignant tumors is discussed. The results of our investigation is reported as follows.

MATERIALS AND METHODS

General data

Nine hundred and 10 patients with nipple discharge were examined by FDS in the GMCH from October 1998 to December 2003. The ages ranged from 16 to 76 with a median age of 41. The time of nipple

discharge was from 1 day to 120 months. After the FDS examinations, 327 patients accepted surgical treatment in the hospital and a definite pathological diagnosis was obtained. There were 229 cases of intraductal papilloma (papillomatosis), 50 had ductal carcinoma in situ (DCIS) or early invasive breast cancer (EIBC) and 48 had adenosis of the breast or a fibroid mastoses.

Instruments and detection methods

A FDS3000 fiberoptic ductoscope system produced by Mitsubishi Company of Japan was utilized. The major operative process included local sterilization, fixation of the nipple and insertion of a home-made dilator into the papillary foramen. Then a 0.9% saline containing 1% Lidocaine was infused with gradual insertion of the introscope to keep the latex tube dilated and the field of vision limpid. When the examination was concluded, the saline was discharged and an antimicrobial ointment smeared on the nipples. Bathing was not permitted on the day of the examination.

RESULTS

Ductoscopic appearance

The major character and the typing of the character for intraductal papilloma (papillomatosis), DCIS and EIBC using the fiberoptic ductoscope (FDS) mainly included whether there was a change in the vessel wall surface and whether there was an intraluminal protruding lesion, as well as its shape, position, size and superficial status, etc. According to various characters of the lesions, by consulting the methods in references 1 and 2, [1,2] the appearance of the lesions observed with FDS examination were divided into 4 types as follows: a) monothelia type (type I): the entity with mono-papillary, global, hemispheric or buninoid shape in the lumen was seen to protrude on the tubal wall or to fill the lumens, without apparent abnormalities in the ambient tubal wall; b) polythelia type (type II): 2 and even more of the entities with a papillary, global, hemispheric or buninoid shape in the lumen was seen to protrude on the tubal wall or to fill the lumen, without apparent abnormalities in the ambient tubal wall; c) superficies type (type III): visible eminence, or diffuse and superficial erection on the tubal wall were not seen in the lumen, with the main appearance being a rough vessel wall, or accompanied by plaque-like lesions and/or a hemorragic focus, etc; d) mixed type (type IV): this type had features of both type I or II and type III. In the cases of group IV, there was one case of intraductal papilloma and two cases of intraductal carcinoma with no apparent abnormality seen under FDS. So these cases were not considered in the summation of the 4 types. Based on the 4 types, the other 276 cases were classified respectively. The chi-square test was used to compare the data between the 2 groups (see Table 1).

Table 1. Typing and comparison for ductoscopic appearance of 276 patients with intraductal papilloma (papillomatosis) and breast cancer (DCIS,EIBC)

Typing of FDS appearance	Intraductal papillomaand papillomatosis	DCIS EIBC	*P* value
I	156	7	<0.001
II	47	8	>0.05
III	11	16	<0.001
IV	14	17	<0.001

FDS was used to improve the diagnostic accuracy of intraductal papilloma (papillomatosis), DCIS and EIBC

For 228 of the 229 patients with intraductal papilloma (papillomatosis), the lesion was found under FDS. Avisible abnormality was not seen in only 1 case; The diagnosis for 224 cases was intraductal papilloma (papillomatosis) and 4 cases were misdiagosed as intraductal carcinoma. In 50 cases with intraductal carcinoma, no apparent abnormalities were seen in two, 41 were diagnosed as DCIS or EIBC, and 7 were diagnosed as papilloma (papillomatosis) (see Table 2).

DISCUSSION

FDS has been gradually applied and popularized for clinical diagnosis since its successful development

Table 2. Diagnostic accuracy of FDS for 279 patients with benign and malignant intraductal papilloma, papillomatosis and breast cancer n (%)

Diseases	n	Detection rate of FDS	Diagnostic accuracy of FDS
Intraductal papilloma and papillomatosis	229	228(99.6)	224(97.8)
DCIS, EIBC	50	48(96.0)	41(82.0)
Total	279	276(98.9)	265(95.0)

during the early 1990s. Compared to traditional mammography and cytological examination of the discharge, etc. the specificity and sensitivity of FDS to determine the etiology of nipple discharge has been widely confirmed. [3,5] However, the value of its application still requires many more case studies as the period for its use has been too short. In our study, 229 cases of intraductal papilloma (papillomatosis) and 50 cases of ductal carcinoma were confirmed pathologically. Among these cases, lesions were found in 276 cases. The detection rate was 98.9%. Similar to the report by Yamamoto, et al.(97.4%).[4] A lesion was undetected under FDS in 1 case of papilloma. A surgical operation was performed when there was doubt about a papilloma, because exfoliation of bulky ductal epithelium was found on the film preparation of the discharge. A papilloma was confirmed after the operation. This result probably occurred due to the FDS failing to be inserted into the branch of the latex tube during the examination.

No overt abnormality was found in one case of intraductal carcinoma when the first FDS examination was conducted, with a diagnosis of ductal dilation. No visible abnormality also was found in the procedures, such as high frequency X-ray photograph or the smear of the discharge of the mammary gland, etc. So a conservative treatment was applied and follow-up conducted. Half a year later, a FDS was performed again because of continuous sanguineous discharge, the FDS showed a slight superficial eminence at the acroteric part of the latex tube, while a high frequency X-ray photograph showed a calcifying focus in the related position. This was later confirmed to be ductal carcinoma after an operation.

In another case with intraductal carcinoma, no apparent abnormality was found in all the diagnostic tests. Dochectomy was performed because of invalid conservative treatment for continuous sanguineous discharge of 1 year. Intraductal papillomatosis was confirmed after surgical treatment, with local canceration. Therefore, for the negative cases after the FDS examination, early surgical treatment would be applicable if there is still the sanguineous polyrrhea after normative treatment.

Using ductoscopic appearance for typings, the major appearance of intraductal papillomas were type I and II while that of DCIS and EIBC were type III and IV; there was a statistical significance in the difference among the typings, except for the difference of proportion of type II between benign and malignant diseases, with no statistical significance, P <0.001, thus indicating the definite guidance of the typing for differentiation of the benign and malignant diseases. Since the 4 types can normally present as benign or malignant lesions, there was still some difficulty for differentiation and diagnosis. According to our experience, a comprehensive decision should be made by combining the distribution of the focus with the superficial form of the focus itself. In the cases of our study group, the ductoscopic appearance for 4 patients with intraductal papillomatosis, misdiagnosed as intraductal carcinoma by FDS, were type IV; in 7 patients with intraductal carcinoma, who had been misdiagnosed as intraductal papillomatosis by FDS, the appearance for type I was found in 4 cases, type II in 2 cases and type IV in 1 case. To summarize the cases of FDS examination failure and misdiagnosis, the diagnostic accuracy of FDS examination for intraductal papilloma (papillomatosis) and ductal carcinoma was 97.8% and 82.0%, respectively; the total rate of sensitivity was 95.0%. According to the report by Matsunaga, a Japanese scholar,[5] the rate of

sensitivity for diagnosis of ductal carcinoma was 80.9% (38/47), which was quite near to the results of our study.

To summarize our research, FDS has very high detection rate of lesions for intraductal tumors, with early discovery of the focus of the lesion. With the methods of ductoscopic typing, the benign and malignant character of the lesions can be easily discriminated and a higher accuracy of the diagnosis can be obtained. It is therefore of considerable value for clinical application in the diagnosis for the etiology of nipple discharge. At the same time, it provides a new means to discover early breast cancer.

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