Breast Duct Endoscopy (Ductoscopy)

**Effective:** August 1, 2017

**Next Review:** May 2018  
**Last Review:** June 2017

**IMPORTANT REMINDER**

Medical Policies are developed to provide guidance for members and providers regarding coverage in accordance with contract terms. Benefit determinations are based in all cases on the applicable contract language. To the extent there may be any conflict between the Medical Policy and contract language, the contract language takes precedence.

PLEASE NOTE: Contracts exclude from coverage, among other things, services or procedures that are considered investigational or cosmetic. Providers may bill members for services or procedures that are considered investigational or cosmetic. Providers are encouraged to inform members before rendering such services that the members are likely to be financially responsible for the cost of these services.

**DESCRIPTION**

Breast duct endoscopy is a technique that provides for direct visual examination of the breast ducts through nipple orifice cannulation and exploration, which is proposed for use in the screening or diagnosis of interductal breast disease.

**MEDICAL POLICY CRITERIA**

Breast duct endoscopy, also known as ductoscopy, is considered **investigational** for all indications, including but not limited to lesion localization, preoperative evaluation, or intraoperative guidance in breast cancer.

*NOTE: A summary of the supporting rationale for the policy criteria is at the end of the policy.*

**CROSS REFERENCES**

None

**BACKGROUND**

Breast duct endoscopy may also be referred to as ductoscopy or mammoscopy. The technique
has been investigated in the following clinical situations: Diagnostic technique in women with spontaneous nipple discharge, where endoscopy might function as an alternative to surgical excision; technique to obtain cellular material to stratify women for risk of breast cancer; as a follow-up for women with atypical cytology as detected by ductal lavage (see Medicine policy No. 93); delineation of intraductal disease to define margins of surgical resection; and in the direct delivery of therapeutic agents, including photodynamic therapy, laser ablation, topical biological agents, etc. Of related interest, three-dimensional reconstruction techniques of CT-scans are now being studied in another approach referred to as virtual ductoscopy.

**Note:** This policy addresses breast duct endoscopy only. For discussions of breast epithelial cell cytology (ductal lavage), see Medicine, Policy No. 93.

## EVIDENCE SUMMARY

Early on, preliminary feasibility studies had mixed results on the utility of ductoscopy.[1-3] Vaughan et al reported ductoscopy to be useful for lesion localization and intraoperative guidance, but not helpful in preoperative evaluation.[4] In contrast, a literature review by Uchida et al concluded that ductoscopy was useful for diagnosing intraductal lesions in patients with nipple discharge, but that ductoscopic biopsy and therapeutic interventions need further development.[5] Randomized controlled trials comparing ductoscopy to standard diagnostic techniques have not been reported.

Majority of the studies of breast duct endoscopy are in patients with pathologic nipple discharge. Among women with spontaneous nipple discharge, diagnostic follow-up may be conducted with mammogram (including ductogram), ultrasound, magnetic resonance imaging, core needle biopsy, and/or ductal excision.[6] Validation of the proposed use(s) of breast duct endoscopy in comparison with these standards of care must require data regarding its analytic validity (technical feasibility), its clinical validity (i.e., sensitivity, specificity and positive and negative predictive value) compared to a gold standard, and finally data regarding how the diagnostic information will be used in the management of the patient and whether beneficial health outcomes result (i.e., clinical utility).

## SYSTEMATIC REVIEWS

In 2016, Waaijer and colleagues published a comprehensive systematic review addressing the diagnostic accuracy of ductoscopy in the diagnosis of malignancy in patients with pathological nipple discharge (PND).[7] According to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, the authors selected reviewed twenty original clinical trials with at least 25 patients, which reported ductoscopic outcomes and used histological assessment and/or follow-up as a reference test. Study quality was assessed used the Assessment of Diagnostic Accuracy Studies (QUADAS) 2 questionnaire. Findings were well-described and classified as DSany, DSSus, positive, and non-suspicious/negative for any visualized finding at ductoscopy, suspicious findings, normal ducts, and normal ducts, intraductal debris or polypoid lesions, respectively. Overall, there was a low risk of bias in: patient selection in 70 percent of studies (14 of 20), the index test in 65 percent of studies (13 of 20), the reference standard in 70 percent of the studies (14 of 20). Pooled sensitivity and specificity (from twelve studies with 1994 ductoscopies) for DSany were 94 (95% CI, 88-97) and 47 (95% CI, 44-49) percent, respectively. Pooled sensitivity and specificity (from eight studies with 933 ductoscopies) for DSSus were 50 (95% CI, 36-64) and 83 (95% CI, 81-86) percent, respectively. The review was predominantly limited by heterogeneity in interpretation of ductoscopy between studies; reported interpretations were observer-dependent and
subjective, despite there being a proposed and validated universal scale of rating endoscopic findings. Patient characteristics were also limiting; inclusion methods were poorly reported. Given these results, the authors concluded that histological confirmation is still necessary to exclude malignancy in patients with PND and positive ductoscopy, and that the procedure should only be implemented at select, specialized breast clinics.

NONRANDOMIZED STUDIES

In a 2017 study, Yilmaz examined the detection of anomalies in patients with pathological nipple discharge in 50 patients and evaluated the anomalies using three methods: ultrasonography, magnetic resonance imaging, and ductoscopy\[8\]. In the 25 patients that underwent endoscopic excision, findings were compared with pathology results. In the remaining patients, results were analyzed between the methods tested. The sensitivity of ultrasonography was 75% and the specificity was 66.7%. The sensitivity of magnetic resonance imaging was 90% and the specificity was 66.7%. The sensitivity of ductoscopy was 94.6% and the specificity was 40%. The authors suggest that neither magnetic resonance imaging nor ductoscopy is superior to the other but that they are both superior to ultrasonography.

In 2012, Kamali and colleagues reported on the efficacy of ductoscopy in the diagnosis and management of intraductal lesions as compared to standard methods.\[9\] Data on 357 ductoscopic investigations from patients with nipple discharge were collected prospectively. Seventy-five patients were diagnosed as having intraductal papillary lesions and these cases were evaluated by final histopathology (55 solitary, 14 multiple papillomatosis, 6 premalignant or malignant lesions). The sensitivities of investigation methods for papillomas in this study were 72 % in ultrasonography, 62.9 % in mammography, 81.4 % in galactography, and 86.6 % in ductoscopy. With ductoscopic papillomectomy (DP), almost 30% of patient with solitary papilloma did not require further extensive surgery. Authors suggest that ductoscopy is a minimally invasive intervention and can aid in the follow-up of lesions proven to have no atypia, or when multiple, larger papillomas are not present.

A retrospective study evaluated patients with nipple discharge who underwent ductoscopy and had a diagnosis of cancer.\[10\] In this small series of cancer patients, duct wall irregularities or intraluminal growths were noted during ductoscopy in 57% (8 of 14) of breast cancer patients. The authors concluded that no clear morphologic changes noted during ductoscopy definitively indicated malignancy.

Hunerbein et al. reported results using a new, rigid ductoscope during the evaluation of 66 patients with breast cancer and 45 patients with nipple discharge.\[11\] In this case series, intraductal lesions were noted in 41% of patients with breast cancer. In addition, 16% of “normal” ducts had extensive intraductal lesions.

Similarly, Dubowy and colleagues reported on the use of a new, rigid ductoscope for intraductal biopsy.\[12\] Although patient selection criteria were not specified, the device was tested against mammography and/or galactography among patients with breast cancer (n=53) or nipple discharge (n=49). An unspecified number of patients also underwent ductal lavage. The researchers reported that their technique was more accurate than the comparator tests; however, sensitivity, specificity, and negative and positive predictive values of any of the tests were not reported, meaning that overall accuracy between diagnostic methods was not able to be directly compared. In addition, due to lack of randomization and long-term follow-up, it is not
clear whether additional testing and biopsy with this ductoscope prototype resulted in improved health outcomes.

Grunwald and colleagues compared various diagnostic tests in patients with breast disease.[13] In this study, ductoscopy was compared to mammography, galactography, sonography, magnetic resonance imaging (MRI), nipple smear, fine needle aspiration cytology (FNAC), and high-speed core biopsy. However, not all patients received all evaluations; for example, only 19 patients had galactography. There were 71 ductoscopies that were followed up by open biopsies. Three invasive and 8 ductal carcinomas in situ were found, as well as 3 atypical ductal hyperplasias, 44 papillomas/papillomatoses (all considered to be disease); and 13 benign findings. Feasibility of ductoscopy was 100% in this series. Duct sonography showed the highest sensitivity (67.3%), followed by MRI (65.2%), galactography (56.3%), ductoscopy (55.2%), and FNAC (51.9%). The highest specificity was shown by FNAC, core biopsy, and galactography (each 100%), followed by mammography (92.3%), nipple smear (77.8%), ductoscopy, and duct sonography (each 61.5%); the lowest specificity was displayed by MRI (25.0%). The authors felt these results were promising. In contrast, in a study from China involving 1,048 women evaluated between 1997 and 2005, Liu identified 49 of 52 (94%) of cancers among women presenting with spontaneous nipple discharge.[14] However evaluation and follow-up was limited among the 489 cases that had normal ductoscopy and cytology. The authors did note that 77 of these cases underwent tissue diagnosis within a median follow-up time of 19 months during which one malignancy (DCIS) was diagnosed.

In 2010, Tang and colleagues conducted a literature review and reported a continued lack of prospective randomized trials, noting that these “would be crucial to validate current opinion.”[15] The authors concluded that the role of breast duct endoscopy in breast cancer screening and conservative surgery has yet to be fully defined.

SECTION SUMMARY

While published data suggest that breast duct endoscopy is feasible, reports on diagnostic capability continue to be mixed, with many studies concluding that additional data from larger clinical trials will be required to determine the sensitivity, specificity and positive and negative predictive values of breast duct endoscopy. Although a number of authors have concluded that breast duct endoscopy is a valuable diagnostic tool, direct comparison between breast duct endoscopy and other diagnostic techniques are limited to nonrandomized studies. In addition, there are minimal studies reporting on how the results of breast duct endoscopy influence either the decision to undergo biopsy or excision, or influence the extent of the excision.[1,16-22]

PRACTICE GUIDELINE SUMMARY

No evidence-based guidelines or position statements were found that recommend the use of breast ductoscopy for screening, diagnosis, or treatment of breast cancer. The National Comprehensive Cancer Network Guidelines in Oncology (NCCN Guidelines) Clinical Practice Guidelines for Breast Cancer (2017) are silent on the use of breast duct endoscopy. The NCCN Guidelines for Breast Cancer Screening and Diagnosis (2015) mention ductoscopy in the discussion on nipple discharge without a palpable mass, only insofar as to say, “ductoscopy is useful in evaluating patients who have nipple discharge, for accurate visualization, analysis, and excision of intraductal abnormalities.”[6]
SUMMARY

There is not enough research to show that breast duct endoscopy improves health outcomes when used in the screening or diagnosis of interductal breast disease. No clinical guidelines based on research recommend breast duct endoscopy for the screening or diagnosis of interductal breast disease. Therefore, breast duct endoscopy is considered investigational for all indications, including but not limited to lesion localization, preoperative evaluation, or intraoperative guidance in breast cancer.

REFERENCES


### CODES

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*Date of Origin: May 2004*