**Accuracy of Biliary Brushing Cytology and Fluorescence In Situ Hybridisation**

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**Introduction and objective**

- Cytological evaluation of biliary brushings is specific but insensitive for detecting malignancy. Fluorescence in situ hybridisation (FISH) is an adjunct that may potentially increase the sensitivity.
- We aimed to assess the accuracy of biliary FISH and cytology in detecting malignancy.

**Materials and methods**

- Upon retrospective review we found 55 biliary brushing cytology specimens in our department that were sent for modified UroVysion probe FISH test between late 2013 to early 2018.
- “Benign” and “atypical” cytological diagnoses were considered negative; while “suspicious for malignancy” and “malignant” cases were considered positive on cytology.
- As for FISH assay, ten or more cells exhibiting trisomy of CEP 3, CEP 7 or CEP 17, or homologous loss of p16 was the criteria for the positive FISH result.
- The follow-up histopathological diagnosis and clinical findings were used as the gold standard to calculate the performance characteristics of FISH and cytology.

**Results**

- Cytology had a better sensitivity when compared to FISH (58% versus 25%) while FISH had a slightly higher specificity (97% versus 100%) (Fig 1).
- The positive predictive value (PPV) of conventional cytology and FISH were 93% and 100%, respectively; negative predictive values (NPV) were 75% and 63%, respectively.
- However, there were 33% of false negative cases seen with FISH assay.
- When combined both the cytology and FISH in interpreting the biliary brushings, the sensitivity was increased to 68% and the specificity remained at 97%.

![Performance characteristics of cytology, FISH and combined tests](image)

**Discussion and Conclusion**

- The sensitivity and specificity of cytology in our centre is comparable with other studies. The range of sensitivity in literature is 26% to 89% and the range of specificity is 80% to 100% according to Volmar et al.¹
- Our results showed that the combination of cytology analysis and FISH increased the sensitivity to 68% which is also consistent with other studies.²
- FISH alone had quite a low sensitivity (25%) and may not be suitable as a solitary test in our setting.
- In conclusion, FISH helped in increasing the sensitivity of brush cytology while maintaining the high specificity.

**Figures**

- Fig 1: Performance characteristics of cytology, FISH and combined tests
- Fig 2*: FISH. Polysomy of chromosomes 3, 7 and 17. Absence of p16 loss.
- Fig 3*: FISH. Normal
- Fig 4: Biliary brushing cytology (A) Normal. (B) Malignant. (C) Atypical. (D) Suspicious for malignancy.

*CEP3: pink signals; CEP7: green signals; CEP17: blue signals; p16: orange signals

**References**