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A Clinical Assessment on Incidental Prostate Cancer in Patients Treated for Benign Prostatic Hyperplasia

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Abstract
The clinical condition known as accidental PCa (iPCa) is characterised by the possibility of PCa being unintentionally discovered when examining resected tissue from BPH procedures under a microscope. The purpose of this research is to determine the incidence of iPCa after BPH surgery, to analyse the related surgical techniques to closely examine the preoperative and postoperative care. Software from Epi Info Epidemiological 7 Statcalc and SPSS 18.0 (Statistical Package for Social Sciences Inc., Chicago, IL, USA) were used to statistically analyse the study's data. Descriptive statistics were used to display the data, including number (n), percentage (%), mean±standard deviation (SD) mean (min–max) values. A 5% margin of error and a 95% confidence interval (CI) were used to analyse causal linkages. TURP was the most frequently done operation, with 18266 instances (or around 82.5% of all procedures). RASP had the lowest frequency, with 1090 operations (4.9%). The contemporary prevalence of iPCa after BPH surgery.

INTRODUCTION

The identification of latent tumours during autopsies and the serum prostate-specific antigen (PSA) screening of asymptomatic people are believed to have had a significant impact on the rising prevalence in recent years[1]. For benign prostatic hyperplasia (BPH), transurethral resection of the prostate (TUR-P) is regarded as the conventional surgical procedure[2]. TUR-P focuses on the prostate's transitional zone. Transrectal needle core biopsy is the gold standard for confirming the diagnosis in individuals with high PSA levels since the majority of prostate malignancies originate in the peripheral zones. It is rare to find prostate cancer localised just in the transitional zone certain tumours, particularly those with modest volume, may not raise PSA[3,4]. According to a number of recent research, malignancies that start in the transitional zone usually have a better prognosis than tumours that start in the peripheral zone[4,5]. Clinical T1 or incidental prostate cancer (IPC) is defined as prostate cancer detected during a TUR-P procedure for benign prostatic illness, but not clinically detectable by direct rectal examination or imaging modalities[6,7]. Due to the increasing use of serum PSA screening, the incidence of IPC in TUR-P specimens has significantly reduced. There is a range of reports in the literature on the prevalence of IPC, ranging from 1.4-16.7%.5 The majority of IPCs are thought to be clinically insignificant, yet new research indicates that the clinical course may worsen in some cases[8]. It has been shown that certain IPCs, particularly tumours with a higher Gleason score and stage T1b, are clinically significant[9]. The study's aim was that a more thorough clinicopathological evaluation of incidental prostate cancer in TUR-P tissues would identify significant patterns in the malignancy and help with treatment choices.

Different concerns apply to the diagnosis and treatment of iPCa than to PCa revealed by biopsy. First off, compared to a biopsy protocol that assesses the peripheral zone, the most common site of PCa onset, the transitional zone of the prostate, which represents the prostatic tissue removed during BPH surgeries, does not permit an accurate estimation of the tumor's extent and grading[9]. This presents further questions about the PCa's exact grade and the possibility of requiring a second biopsy procedure to determine the tumor's precise size and grading.

Moreover, fragmentation and energy-induced damage reduce the diagnostic utility of tumor-related specimens recovered via transurethral resection or enucleation. Nonetheless, there is unification under the pathological T1 (pT1) stage due to the lack of defined therapeutic plan for this distinct diagnostic group in international recommendations[9].

The purpose of this research is to determine the current incidence of iPCa after BPH surgery, to analyse the related surgical techniques to closely examine the preoperative and postoperative care.

MATERIALS AND METHODS

The inclusion of distinct patient identity codes in the dataset enables time-specific longitudinal study while maintaining the de-identification of patient data. Additionally, this database facilitates the longitudinal analysis of patient trajectories by cataloguing healthcare contacts across inpatient and outpatient settings. Comprehensive coverage is provided for all payer models in all states and territories of the .Region. The population and outcomes within the database were identified using Current Procedural Terminology (CPT) codes[10], Specific International Classification of Diseases (ICD), both 9th (ICD-9)[11] and 10th (ICD-10) editions[12] those codes. Independent third parties conduct thorough audits and review procedures to guarantee data integrity.

Our main goals were to find out how common iPCa was after BPH surgery and to analyse the different approaches used to therapy. Assessing how prostate biopsy (PB) and prostate magnetic resonance imaging (MRI) influence iPCa detection rates and how their usage has evolved over time was the secondary goal. Furthermore, we assessed procedure-and patient-related risk variables for iPCa diagnosis.

Statistical Analysis: Software from Epi Info Epidemiological 7 Statcalc and SPSS 18.0 (Statistical Package for Social Sciences Inc, Chicago, IL, USA) were used to statistically analyse the study's data. Descriptive statistics were used to display the data, including number (n), percentage (%), mean±standard deviation (SD) mean (min-max) values. A 5% margin of error and a 95% confidence interval (CI) were used to analyse causal linkages. The associations between categorical data in independent groups were examined using the Pearson Chi-square test, Yates Corrected Chi-square test Fisher's exact test.

RESULTS AND DISCUSSIONS

Following data extraction, 22136 patients who underwent BPH surgery during the study period were identified. The baseline and preoperative characteristics are presented in (Table 1).

The most performed procedure was TURP, accounting for 18266 cases (approximately 82.5% of the overall procedures). The least common was RASP, with 1090 procedures (4.9%).

Multi variate logistic regression (MLR) analysis revealed age and open simple prosta-tectomy as additional risk factors for iPCa diagnosis (Table 2). Conversely, undergoing PB and MRI before surgery was

Table 1. Baseline characteristics of patients undergoing BPH surgery and for individual BPH proce- dures during the study period.

	Overall BPH Surgery
Procedures, n (%)	22136
Age, mean (SD)	72.71 (8.04)
CCI, mean (SD)	4.60 (3.91)
PB before surgery (6 months), n (%)	1350 (6.0)
MRI before surgery (6 months), n (%)	670 (3.0)
PB and MRI before surgery (6 months), n (%)	268 (1.2)
iPCa, n (%)	450 (2.3)
PB before iPCa (6 months), n (%)	695 (3.1)
MRI before iPCa (6 months), n (%)	515 (2.3)
PB and MRI before iPCa (6 months), n (%)	67 (0.30)

Table 2. Multi variable logistic regression analysis for predictors of Incidental PCa after BPH surgery.

	Adjusted Odds Ratio	95% Confidence Interval	p-value
Age (years)	2.03	2.020-2.029	<0.001
Prostate MRI before surgery	0.84	0.703-0.957	0.0117
Prostate Biopsy before surgery	0.76	0.655-0.842	<0.001
MRI and Prostate Biopsy before surgery	0.63	0.420-0.848	0.005
TURP (reference)	1	-	-
HoLEP/ThuLEP	0.69	0.599-0.775	<0.001
Open Simple Prostatectomy	2.18	2.021-2.323	0.0243
Robot-Assisted Simple Prostatectomy	0.80	0.640-0.970	0.0243

linked to a decreased risk of iPCa. Specifically, pre-surgical prostate MRI was associated with an 18% risk reduction (OR (95% CI) = 0.82, (0.702-0.956), p = 0.011) PB before surgery was correlated with a 26% risk reduction (OR (95% CI) = 0.74, (0.654-0.840), p<0.001). The concurrent use of MRI and PB was linked to a significant decrease in iPCa risk by 39% (OR (95% CI) = 0.60 (0.42-0.85), p<0.005). The HoLEP/ThuLEP procedures also correlated with a lowered risk of iPCa (p<0.05).

This figure is <previous publications that show rates ranging from 5.6%-23%,13 but it is comparable to other research using comparable methodologies[14-16]. These differences in incidence rates may have several causes, according to conjecture.

First, it makes sense to take into account that postoperative histological examination has been used as an inclusion criteria in single and multicentric studies evaluating the incidence of iPCa, nevertheless, this criterion may not be applicable in national dataset investigations. One possible contributing factor might be the fact that the majority of studies with higher rates come from academic or tertiary referral centres, these establishments often work with urologists who specialise in their field, which may have an impact on the diagnosis rate[17]. Lastly, it is possible to argue that surgical volumes associated with academic or tertiary centres may be correlated with better specimen quality after BPH surgery, thereby raising the iPCa detection rate[18].

The use patterns of MRI and biopsy in the six months before to the BPH surgery are an interesting discovery. Prevalence rates of 6.6%, 3.9% 1% for MRI, PB their combination were noted. Although the PB rate is almost twice as high as the MRI rate, different patterns were seen in the temporal analysis of both diagnostic techniques during the course of the investigation. On the one hand, there was a discernible rise in MRI use. Preoperative PB, on the other hand, significantly decreased. There was no change in the annual incidence of iPCa due to changes in the use of these preoperative diagnostic techniques. It might be argued that the introduction of prostate MRI and the PI-RADS classification system originally released in 2012 with version[19] and upgraded in 2015 with version[20] enabled researchers to gradually reduce the number of preoperative biopsies. In terms of specific procedures, RASP has the greatest rates of MRI and PB preoperative use. This may be explained by the bigger prostate volumes seen after this treatment in addition to higher PSA values, which call for more careful monitoring of these individuals. But this doesn't explain the increased rates in comparison to OSP and HoLEP/ThuLEP. This disparity may be explained by the greater expenses of robot-assisted treatments, which would not be acceptable in the event that iPCa was discovered and may thus necessitate a more comprehensive preoperative diagnostic strategy[21].

Prostate magnetic resonance imaging (MRI) and PB were shown to be significant predictors of iPCa diagnosis in multi variable logistic regression analysis. When these two diagnostic modalities were combined, the risk reduction increased to 40%. In contrast, age was linked to a higher risk for iPCa, consistent with overall epidemiological findings[22].

It was believed that the sample size, inclusion and exclusion criteria regional and ethnic features were the causes of the discrepancies between the findings of the present research and those of some other studies. IPCs in T1b stage had a worse prognosis than those at T1a stage, according to many studies[23]. Life expectancy, tumour characteristics found in the pathology report of the TUR-P specimen PSA level after TUR-P are used to evaluate the treatment vs. no treatment option[24]. Given this knowledge, thorough histopathological and clinical assessments might be seen to be crucial for accurate diagnosis-making as well as for the development of suitable therapy and follow-up

programmes. The present research set out to ascertain the incidence and risk factors for prostate cancer that was unintentionally discovered in TUR-P tissues. Furthermore, an assessment and comparison were conducted regarding the associations between several clinical and histological characteristics and T1 stages. There were several restrictions on this research. Evaluation of the prognosis and course of therapy was not possible since information on postoperative follow-up was unavailable for all patients. While this research adds to the body of knowledge, further retrospective and prospective randomised investigations of larger series are still required to assess the associations between other pertinent characteristics and the prognosis and management of IPC patients.

CONCLUSIONS

According to our research, <3% of cases of iPCa occur nowadays after BPH surgery. The rise in prostate MRI use coincides with a fall in prostate biopsy usage before BPH surgery, however it does not lead to a higher incidence of iPCa discovery. Compared to PCa discovered by a biopsy, iPCa is often treated differently in standard clinical practice today.

REFERENCES

1. Bray, F., J. Ferlay, I. Soerjomataram, R.L. Siegel and L.A. Torre et al., 2018. Global cancer statistics 2018: Globocan estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA. A. Can. J. Clinic., 68: 394-424.
2. Trpkov, K., J. Thompson, A. Kulaga and A. Yilmaz, 2008. How much tissue sampling is required when unsuspected minimal prostate carcinoma is identified on transurethral resection? Arch. Pathol. Lab. Med., 132: 1313-1316.
3. Rajab, R., G. Fisher, M.W. Kattan, C.S. Foster and H. Møller et al., 2011. An improved prognostic model for stage t1a and t1b prostate cancer by assessments of cancer extent. Mod. Pat., 24: 58-63.
4. Perera, M., N. Lawrentschuk, N. Perera, D. Bolton and D. Clouston, 2015. Incidental prostate cancer in transurethral resection of prostate specimens in men aged up to 65 years. Prost. Int., 4: 11-14.
5. Özbey, C. and K. Öztorun, 2019. Frequency of incidental cancer in transurethral prostate resection materials and our clinical approach to these patients; a retrospective file scan. Kafk. J. Med. Sci., 9: 11-16.
6. Otto, B., C. Barbieri, R. Lee, A.E. Te, S.A. Kaplan, B. Robinson and B. Chughtai, 2014. Incidental prostate cancer in transurethral resection of the prostate specimens in the modern era. Adv. Urol., Vol. 0 .10.1155/2014/627290.
7. Varghese, J., P.M. Kuruvilla, N. Mehta, R.S. Rathore and M. Babu et al., 2016. Incidentally detected adenocarcinoma prostate in transurethral resection of prostate specimens: A hospital based study from India. As. Pac. J. Can. Prev., 17: 2255-2258.
8. Sakamoto, H., K. Matsumoto, N. Hayakawa, T. Maeda and A. Sato et al., 2014. Preoperative parameters to predict incidental (t1a and t1b) prostate cancer. Can. Urolo. Assoc. J., 8: 815-820.
9. Capitanio, U., R. Autorino, M. Bandini, A. Briganti and L. Cheng et al., 2022. Incidental prostate cancer (ct1a–ct1b) is a relevant clinical and research entity and should be fully discussed in the international prostate cancer guidelines. Eur. Urol. Oncol., 5: 256-258.
10. Alluri, R.K., H. Leland and N. Heckmann, 2016. Surgical research using national databases. Ann. Transl. Med., Vol. 4, No. 393 .10.21037/atm.2016.10.49.
11. Scheipner, L., R.B. Incesu, S. Morra, A. Baudo and A. Assad et al., 2023. Characteristics of incidental prostate cancer in the united states. Prost. Canc. Prost. Dis., Vol. 0 .10.1038/s41391-023-00742-7.
12. Sakai, A., T. Borza, A. Antar, E. Richmond and G.O. Allen et al., 2024. Incidental prostate cancer diagnosis is common after holmium laser enucleation of the prostate. Urology., 183: 170-175.
13. Guo, Z., J. He, L. Huang, Z. Wang and P. Hu et al., 2022. Prevalence and risk factors of incidental prostate cancer in certain surgeries for benign prostatic hyperplAsia: A systematic review and meta-analysis. Int. braz. j. urol., 48: 915-929.
14. Klein, C., T. Marquette, G. Capon, M. Yacoub and E. Alezra et al., 2022. Incidental prostate cancer after holmium laser enucleation of the prostate: Incidence and predictive factors for clinical progression. Int. J. Clin. Oncol., 27: 1077-1083.
15. Matheus, W.E., U. Ferreira, E.A. Brandão, A.A. Ferruccio and A. Billis, 2019. The importance of histopathologic review of biopsies in patients with prostate cancer referred to a tertiary uro - oncology center. Int. braz. j. urol, 45: 32-37.
16. Bradbury, A., C.J. Evans, P. Allan, A.J. Lee, C.V. Ruckley and F.G.R. Fowkes, 2000. The relationship between lower limb symptoms and superficial and deep venous reflux on duplex ultrasonography: The edinburgh vein study. J. Vasc. Surg., 32: 921-931.
17. Barentsz, J.O., J. Richenberg, R. Clements, P. Choyke and S. Verma et al., 2012. Esur prostate mr guidelines 2012. Eur. Radiol., 22: 746-757.

18. Weinreb, J.C., J.O. Barentsz, P.L. Choyke, F. Cornud and M.A. Haider et al., 2016. Pi-rads prostate imaging-reporting and data system: 2015, version 2. Eur. Urol., 69: 16-40.
19. Lees, T.A. and J.D. Holdsworth, 1995. Assessment and treatment of varicose veins in the northern region. Phlebology: The J. Venous Dis., 10: 56-61.
20. Bergengren, O., K.R. Pekala, K. Matsoukas, J. Fainberg and S.F. Mungovan et al., 2023. 2022 update on prostate cancer epidemiology and risk factors—a systematic review. Eur. Urol., 84: 191-206.
21. Yun, M.J., Y.K. Kim, D.M. Kang, J.E. Kim, W.C. Ha, K.Y. Jung and H.W. Choi, 2018. A study on prevalence and risk factors for varicose veins in nurses at a university hospital. Saf. Health at Work, 9: 79-83.
22. Abedi, A.R., S. Ghiasy, M. Fallah-karkan, A. Rahavian and F. Allameh, 2020. the management of patients diagnosed with incidental prostate cancer: Narrative review . Res. Rep. Urol., 12: 105-109.