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Variations in the Arterial Supply of Prostate Gland in the South Indian Population-Cadaveric Study

Rajendra R[1], Makandar UK[2], Surendra M[3], Tejaswi HL[4]
[1]Professor & HOD, [2]Associate Professor, [3]Professor, [4]Assistant Professor, Department of Anatomy, AIMS. B.G. Nagara, Nagamangala, (Tq) Mandya(Dist)

ABSTRACT

28 Non-Pathogenic adult cadaveric specimens of prostate were dissected, the arteries supplying them were painted with red Asian paint. It was observed that incidence of Inferior vesical artery is 12(42.8%), Internal pudendal artery is 4(14.21%), obturator artery is 4(14.21%). Umbilical artery 4(14.21%), Middle rectal artery is 2(7.14%), and gluteopudendal trunk is 2(7.14%).These findings differ with previous studies abroad. This study will certainly help the clinicians, Uro-surgeons &Radiologists because benign hypertrophy of prostate is quite common after the age of fifty and in India second leading cause of cancer death is prostatic cancer.[1]

Keywords: *Inferior Vesicalartery, Middle Rectal Artery, Internal Pudendal Artery, Cannulated*

INTRODUCTION

Arterial supply of prostate gland is usually by inferior vesical, middle rectal and internal pudendal arteries.These all three are branches of Internal Iliac artery , but apart from these branches other branches of internal Iliac arteries also supply to the prostate frequently which is great alarming for Laparoscopic or Uro-surgeon during prostatectomy.Although various radiological techniques like computed Tomographic angiography & Digital Subtraction Angiography (DSA) footages are used to visualizethe arteries of prostate but exact branches, termination are not clearly visualized. Hence attempt is made to study the arterial variations by dissecting the cadaveric specimens of prostate.

MATERIAL AND METHOD

28 Specimens of prostate of adult are selected for study. The common and external Iliac arteries are ligated close to their origin and former is cannulated distally and injected with acetone and then cleaned with distilled water to remove clot, Arteries supplying to prostate are traced by dissection, applied with turpentine oil and allowed to dry completely. Then arteries are painted with red Asian paint and allowed to dry.These specimensare preserved in 5% formalin.

OBSERVATION AND RESULTS

Specimens 1 & 19 - artery arises from obturator artery 1cm from its origin from internal iliac artery, gives branches to both anterior & posterior surfaces of gland. There is no inferior vesical artery (FIG-1)

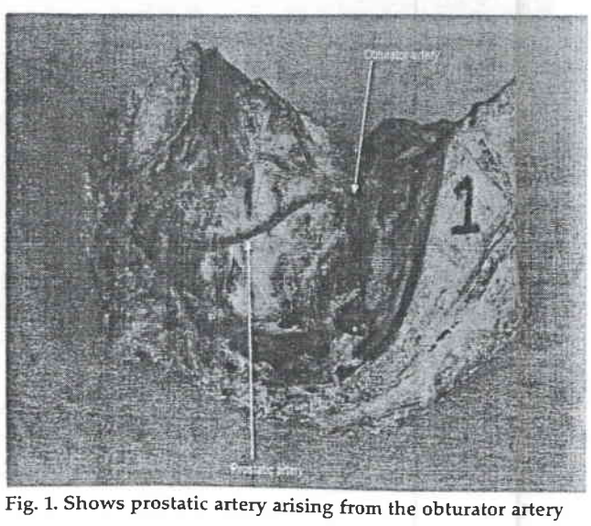
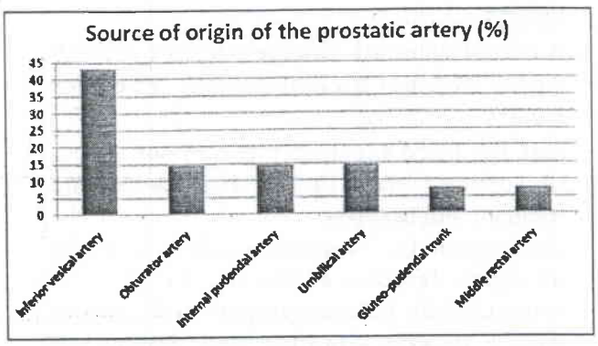


Fig. 1. Shows prostatic artery arising from the obturator artery

Corresponding author:
Rajendra R
2139, 2nd cross, 2nd phase, Rajivnagar 2nd Stage,
Mysore-570019
PH-9945967597
E-mail: dr.rajendra.r.gmail.com

Table 2: Present study compared with previous workers

Author name and year	Umbilical artery(%)	Middlerectal artery(%)	Obturatorartery (%)	Internal pudendalartery (%)	Vesicalartery (%)
Bilhim.T.(2012)	20%	8.4%	12.6%	34%	-
Braithwaite J.L(1952)	7%	-	4.3%	25.7%	6%
Clegg E.J(1955)	83%	30%	-	-	59%
Awataguti.S(1939)	90%	-	5%	-=	-
Bumpus H.C &Antopol. W. (1934)	93.2%	-	5.3%	-	-
Present study	14.2%	7.13%	14.2%	14.2%	42.8%



DISCUSSION

In the present work total 28 specimens of prostate is studied out of them 12 are supplied by Inferior vesical artery (42.8%), 4 are supplied by internal pudendal artery (14.2%), 4 are supplied by obturator artery (14.2%), 4(14.2%) are supplied by umbilical artery, 2(7.14%) are supplied by Gluteo- pudendal trunk and 2 (7.14%) are supplied by middle rectal artery. (Shown in the figs.1-5)

The present incidence of 14% of internal pudendal artery, varies with the previous workers as they observed 30%-34% incidence of internal pudendalartey[2,3].But agrees with some of the previous workers in the case of middle rectal artery which is 8.4% in their studies (4). In the present study, highest incidence of inferior vesical artery (42.8%) is supported by the previous studies.[5,6,7] (Table-2)

There is no documentation available to justify these variations in arterial supply of south Indian cadaveric prostates. The probable reasons could be

(a) In general arteries pursue the shortest most direct course in order to reach their destination & this course is partly determined by mechanical convenience

(b) The angle at which branches leave a arterial system certainly depends to a considerable extent on haemo-dynamic factors. It is possible to calculate theoretically at what angle branching should be, for the least possible loss of energy in the circulation so that fall of pressure at the branch & the main vessel should be equal. The angle varies between70^0-90^0. The bifurcation of common iliac artery should be 75^0[8]. If the degree is more or less, then 75% leads to variations in the arterial pattern to maintain haemo-dynamic pressure.

(c) Differential growth of common iliac artery might have resulted in variations in the arterial pressure.

(d) Constance of arterial supply is partly morphogenetic & partly mechanical convenience.

(e) Slight variations in size & position of prostate gland might have resulted in variations in the arterial pattern.

(f) Comparative anatomically or evolutionarily persistence of arterial pattern may appear mechanically disadvantageous.

(g) Functionally connected structures inevitably make simultaneous demands on the circulation & from the main source.

(h) Developmentally prostate is dual in origin, fibro-muscular part is mesodermal, glandular part is endodermal; develop at different months of fetal life.[9]. Delay in proliferation of these germ layers might have demanded more vascularity in post natal life which has resulted in variations in the arterial supply.

(i) Embryonic rudiment of glandular tissues can undergo surprising degree of self-differentiation to adopt normal development which requires more vascularity. Hence these variations in the arterial pattern might have resulted.

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