

Evaluation of human urine as a good blood coagulant during as first aid treatment

Anshupriya Mandal¹, Dilipkumar Pal²

¹Department of Botany, Shantiniketan College, Bilaspur, Chhattisgarh, India, ²Department of Pharmaceutical Sciences, Guru Ghasidas Vishwavidyalaya (A Central University), Koni, Bilaspur, Chhattisgarh, India

Correspondence: Anshupriya Mandal, Department of Botany, Shantiniketan College, Bilaspur - 495 001, Chhattisgarh, India. Phone: +91-987302651.
E-mail: mondal.anshu89@gmail.com

ABSTRACT

Blood clotting is a natural device to check the excessive loss of blood from an injury to the body. Naturally, prothrombin and fibrinogen proteins of plasma help in blood clotting at the site of injury. At the time of blood clotting Ca^{++} act as a catalytic agent which helps to convert thrombin from prothrombin. If the amount of calcium ion gains, then the reaction occurred first. It observed that calcium carbonate is added to the injured area of body, and then blood had been clotted very fast. We also noticed that when added calcium ionized substance with blood then the clotting time was decreased from the normal clotting time. It is observed that in human urine analysis there are present Na, K, Cl, Ca, oxalic acid, etc., but when urine is added directly with blood or injured portion there observed that the blood is clotted first because the presentation of calcium ion. If there added Na, K, Cl salt there is no any clotted result. Hence, it can tell that the urine is a good coagulant. It also used as first aid material for the injured or cut portion. In normal diet without using medicine, the amount of Ca^{++} normally presents 100-280 mg/day. Moreover, random urine amount 3-7 mg/dl or maximum 8.5 mg/dl. Those amounts of Ca^{++} are sufficient for blood clotting.

Keywords: Blood clotting, Ca^{++} ion, coagulant

Introduction

In the case of blood clotting, calcium ion had a good role which acts as a catalytic agent. It is experimented that in human urine calcium ions are present in salt or oxalate form.^[1] That calcium ion is help to clot the blood. It is also proved that fresh urine has antimicrobial activity.^[2]

Hence, it can use in wound or injured portion in the human body. The amount of calcium ion depends on dieting of a person.^[3] Any non-vegetarian person who used without medicine and healthy there calcium amount is 100-300 mg/day but in the case of vegetarian person used without medicine there has 50-150 mg/day. But in normally random urine of a person output calcium ion is 3-7 mg/dl.^[4]

Aims of the article

1. Human urine can use as emergency first aid kit for the treatment of injury or cutting portions.

2. It has an antibacterial antifungal activity.^[5]
3. There is present Ca^{++} ion which acts as good coagulant to stop the bleeding from cut or injured places of our body.^[6]

Materials and Methods

Urine collected from well healthy male person, without using any medicine and normal dieting condition some are vegetarians, and some are non-vegetarians.^[7] Urine samples are used for clinical test to determine of various minerals quantity, especially to know the Ca^{++} ion quantity because calcium has an important role to clot the blood. The amounts of minerals are measured pathological laboratory by semi-auto analyzer. Blood is used to know the clotting time normally and after using the urine. Clotting time is determined by capillary tube and slide methods. To precede my experiment, we used some requirements that are sterile disposable pricking needle or lancet, stop watch, dry glass capillary tube (narrow diameter,

Access this article online

Website: sjbr.sperpublications.com

E-ISSN: ***

How to cite this article: Mandal A, Pal D. Evaluation of human urine as a good blood coagulant during as first aid treatment. SPER J Pharm Biol Res 2018;1(1):31-34.

Source of Support: Nil. **Conflict of Interest:** None declared.

This is an open access article distributed under the terms of the Creative Commons Attribution NonCommercial ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non commercially, as long as the author is credited and the new creations are licensed under the identical terms

1-2 mm and minimum 10 cm long), and cotton swab of absorbent cotton. Spirit wetted, cotton swab, 70% v/v ethyl alcohol, etc.^[8] We collected the urine from eight well healthy simple dieted, various ages who were not use any type medicine within 15 days or more. In between of them, some were villagers of Chhattisgarh, and some were West Bengal. The collected urine tested at a clinical, pathological laboratory to know the amount of various types of mineral ions such as Na, K, Ca, and P this ion are diagnosed by semi-auto analyzer. There observed various amounts of minerals present in normal range. The importance of that test to know the amount of calcium because calcium is the important mineral to clot the blood. We are all know that calcium ions are helps as catalytic during the second step of clotting, i.e., to produce thrombin from prothrombin and the presence of prothrombinase enzyme.^[9,10] We used 5 ml urine and added three drops of ammonium oxalate their observed white crystal precipitation then added few drops of acetic acid, no change any color of solution but when added 50% dilute H₂SO₄, the crystal had been dissolved.^[11,12] That proved that the calcium ion present in urine as an oxalate form.^[13] To isolate the calcium oxalate from urine, we followed calcium oxalate digests by Clark-Collip procedure.^[14,15] To determine the clotting time, we used three processes, i.e., capillary tube, test tube, and slide method. Here, the clotting time is 4-8, 4-10, and 6-10 min, respectively.^[16] Here, we also noticed that the clotting time varied on the age of person. The clotting time also counts after use of urine. For this experiment, we followed slide and test tube technique. We used few drops of urine on slide after drying it there

Table 1: Quantity of calcium from collected samples studied by semi-auto analyzer

Sample No.	Age of person	Sex	Normal value (g/24 h)	Analytic value (g/24 h)
1.	18	M	0.01-0.30	±0.13
2.	18	M	0.01-0.30	±0.11
3.	27	M	0.01-0.30	±0.17
4.	39	M	0.01-0.30	±0.20
5.	44	M	0.01-0.30	±0.21
6.	46	M	0.01-0.30	±0.18
7.	56	M	0.01-0.30	±0.20
8.	72	M	0.01-0.30	±0.22

Table 2: Clotting time of blood without using urine

Observation No.	Age (years)	Sex	Capillary tube method		Test tube method	
			Normal time (s)	Counted time (s)	Normal time (s)	Counted time (s)
1.	18	F	240-600	±358	240-600	±372
2.	17	F	240-600	±360	240-600	±392
3.	17	M	180-420	±313	180-420	±321
4.	21	M	180-420	±336	180-420	±342
5.	22	F	240-600	±376	240-600	±380
6.	27	F	240-600	±388	240-600	±393
7.	42	M	180-420	±296	180-420	±312
8.	51	M	180-420	±292	180-420	±315
9.	28	M	180-420	±340	180-420	±358
10.	28	M	180-420	±344	180-420	±358

poured one drop of blood and noticed the results. Furthermore, the same way in case of test tube method used the urine to observe the result. Here noticed that the clotting time is decreased 1-3 min. It also depends on the quantity of calcium oxalate in urine.^[17]

Results

After the experiment, there would be concluded that for the use of urine the blood clotted early then the normal time. Hence, it can use as emergency first aid kit. There we also noticed batter result if the fresh urine use as dropwise on the wounded area there had no any infection and also cure rapidly. It had been applied in my body and many villagers (Tables 1-3).

Discussion

Blood clotting is a natural device to check the excessive loss of blood from an injury caused to the body the process of blood clotting initiated by platelets. Thromboplastin, a lipoprotein, helps in clot formation. Blood clot formation occurs in three steps such as (i) thromboplastin helps in the formation of an enzyme prothrombinase. This enzyme inactivates heparin, and it also converts the inactive plasma protein prothrombin into its active form, thrombin. Both the changes require calcium ions. (ii) Thrombin acts as a proteolytic enzyme to separate two peptides from the soluble plasma protein fibrinogen molecule to form insoluble fibrin monomer. (iii) The fibrin monomers polymerize to form long, sticky fibers. The fibrin threads form a fine network over the wound and trap blood corpuscles to form a crust, the clot.^[18] After bleeding a clot is formed in about 2-8 min (Figure 1).

Conclusion

Human urine has antimicrobial activities that's refers from many journals and also experimental proved. There observed Ca⁺⁺ ion that function as coagulant factor, but it is present very minute amount in human urine. Hence, there observed batter result when it applied as drop wise on the infected part. If any cases there have no any first aid kits for any minimum injury, may use self-urine for primary protection. Hence, it may be called emergency first aid kit.

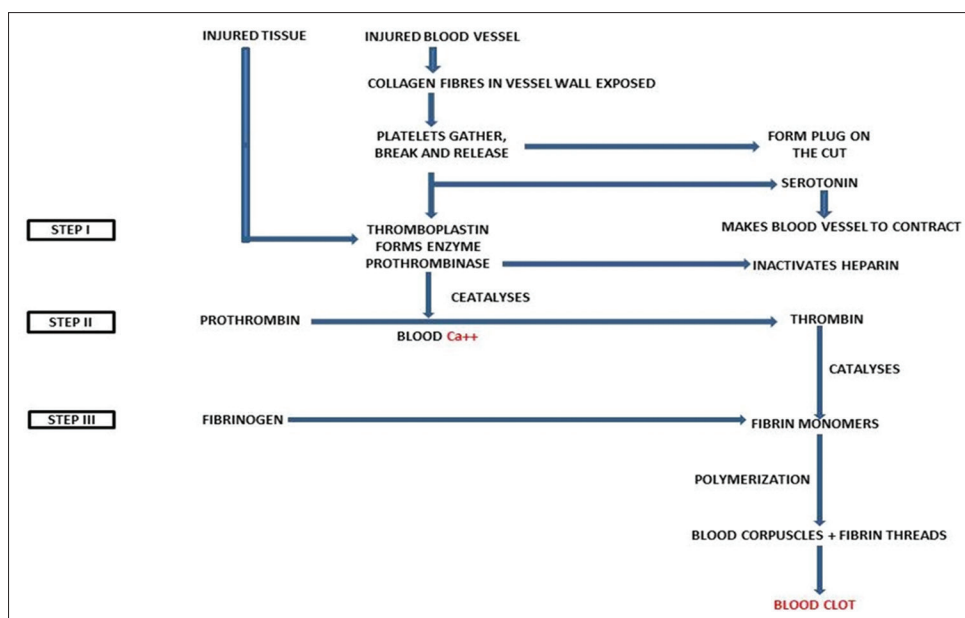


Figure 1: Mechanism of blood clotting

Table 3: Clotting time after using urine

Observation No.	Age (years)	Sex	Capillary tube method	Difference of clotting time after using urine	Test tube method	Difference of clotting time after using urine
			Counted time (second)		Counted time (second)	
1.	18	F	±347	-11	±360	-12
2.	17	F	±415	-5	±392	-5
3.	17	M	±305	-8	±313	-8
4.	21	M	±330	-6	±336	-6
5.	22	F	±376	-0	±378	-2
6.	27	F	±366	-12	±383	-10
7.	42	M	±276	-20	±302	-10
8.	51	M	±290	-2	±315	-0
9.	28	M	±328	-12	±348	-10
10.	28	M	±334	-8	±358	-0

Acknowledgment

Authors are grateful to the Principal of Shantiniketan College, Bilaspur, for giving our necessary permission for this work and also thanks to our laboratory technician and our dear students and villagers for help to fulfill our work.

References

- Brändli D, Reinacher S. Herbicides found in human urine. *Delin Inst Ecol Clim Farming Ithaka J* 2012;270-2. Available from: <http://www.ithaka-journal.net>. [Last accessed on 2012 Jun 07].
- Kaye D. Antibacterial activity of human urine. *J Clin Invest* 1968;47:2374-90.
- Parentoni LS, Pozeti RC, Figueiredo JF, de Faria EC. The determination of total calcium in urine: A comparison between the atomic absorption and the ortho-cresolphthalein complexone methods. *J Bras Patol* 2001;37:235-8.
- Webster WW, Kern WH. Determination of calcium in urine by the chioranilate method. *Clin Chem* 1965;2(9):855-61.
- Heinonen-Tanski H, Sjöblom A, Fabritius H, Karinen P. Pure human urine is a good fertiliser for cucumbers. *Bioresour Technol* 2007;98:214-7.
- Brass EP, Forman WB, Edwards RV, Lin O. Fibrin formation: Effect of calcium ions. Available from: <http://www.bloodjournal.org>. [Last accessed on 2016 Aug 16].
- Pal M, Datta S, Pradhan AK, Ghosh T, Ganguly A, Basu S, *et al*. Determination of upper reference value of urinary calcium-creatinine ratio for the pediatric population in Burdwan district. *Adv Biol Chem* 2013;3:455-9.
- Chutipongtanate S, Nakagawa Y, Sritippayawan S, Ittayamatekul J, Parichatikanond P, Westley BR, *et al*. Identification of human urinary trefoil factor 1 as a novel calcium oxalate crystal growth inhibitor. *J Clin Invest* 2005;115:3613-22. Available from: <http://www.jci.org>. [Last accessed on 2016 Aug 21].
- Putnam DF. *Composition and Concentrative Properties of Human Urine*. California, Washington, D.C: McDonnell Douglas Astronautics Company, LangZey Research Center National Aeronautics and Space Administration; 1971. p. 1-112.
- Nakagawa Y, Margolis HC, Yokoyama S, Kezdy FJ, Kaiser ET, Coe FL, *et al*. Purification and characterization of a calcium oxalate monohydrate crystal growth inhibitor from human kidney tissue culture medium. *J Biol Chem* 1981;256:3936-44.
- Nakagawa Y, Abram V, Kézdy FJ, Kaiser ET, Coe FL. Purification and characterization of the principal inhibitor of calcium oxalate monohydrate crystal growth in human urine. *J Biol Chem* 1983;258:12594-600.

12. Wang CC. Improvements in the Methods for Calcium Determination in Biological Material; 2016. p. 443-54. Available from: <http://www.jbc.org>. [Last accessed on 2016 Sept 13].
13. Ilarslan H, Palmer RG, Imsande J, Horner HT. Quantitative determination of calcium oxalate and oxalate in developing seeds of soybean (*Leguminosae*). *Am J Bot* 1997;84:1042-6.
14. Fiske CH, Logan MA. The determination of calcium by alkali metric titration: II. The precipitation of calcium in the presence of magnesium, phosphate, and sulphate, with applications to the analysis of urine. *J Biol Chem* 1931;93:211-26.
15. Shohl AT, Pedley FG. A rapid and accurate method for calcium in urine. *J Biol Chem* 1922;50:537-44.
16. Luthra K. Basic Concept of Clinical Biochemistry. New Delhi: Department of Biochemistry All India Institute of Medical Sciences; 2006. p. 3-27. Available from: www.m5zn.com/newuploads/2013/10/05/pdf/3702628a49f6a42.pdf. [Last revised on 2008 May 05].
17. Erol I, Buyan N, Özkaya O, Şahin F, Beyazova U, Söylemezoğlu O, *et al.* Reference values for urinary calcium, sodium and potassium in healthy newborns, infants and children. *Turk J Pediatr* 2009;51:6-13.
10. Bogdanova A, Makhro A, Wang J, Lipp P, Kaestner L. Calcium in red blood cells-a perilous balance. *Int J Mol Sci* 2013;14:9848-72. Available from: <http://www.mdpi.com/journal/ijms2013>. [Last accessed on 2013 May 08].